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THE VARIABLE DETERMINACY THESIS

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This Article proposes a novel technique for characterizing the relative determinacy of legal decision-making. I begin with the observation that the determinacy of legal outcomes varies from context to context within the law. To augment this intuition, I develop a theoretical model of determinate legal decision-making. This model aims to capture the essential features that are typically associated with the concept of legal determinacy. I then argue that we can use such an idealized model as a standard for expressing the relative determinacy or indeterminacy of decision-making in actual, observed legal contexts. From a legal theory standpoint, this approach – separating determinacy and indeterminacy into their constituent conceptual elements – helps us to more rigorously define these theoretical ideas. Ultimately, from a practical standpoint, I assert that this framework assists in understanding why legal outcomes in certain contexts are determinate enough to be amenable to resolution by computers.

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"[T]he … conclusions [of the law] … are not so clear, constant, and determinate, as conclusions in logic or mathematics are…."
Lord Chief Justice Matthew Hale (1668) [2]

I. INTRODUCTION

The determinacy of legal outcomes varies throughout the law.[3] Under some factual scenarios liability and other legal determinations appear tolerably constrained.[4] In other contexts, legal outcomes are notoriously unpredictable.[5] Early debates within the legal literature considered whether legal outcomes were largely determinate or indeterminate within American law generally.[6] More recent commentators have

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[2] Matthew Hale, *Preface to Rolle's Abridgement* (1668), *in* Francis Hargrave, Collectanea juridica : Consisting of Tracts Relative to the Law & Constitution of England, 273-275 (Clarke and Sons 1840).

[3] I use "determinacy" as synonymous with "constrained predictability" of legal outcomes. I justify such a usage in Part III.

[4] Drivers proceeding below the speed limit can justifiably consider themselves compliant with vehicular speeding laws. For the proposition that meeting the speed limit is generally considered *prima facie* compliance with the vehicular speed limit laws, *see, e.g.*, *Safe Roads, Happy Visits*, The News-Star, Apr. 14, 2008, at B3, *available at* 2008 WLNR 27264770 ("[W]e don't hear from those same folks is that the police pull them over, ticket or fine them if they obey the posted speed limit."); Clay Evans, *Not About the Revenue. Want to Avoid a Ticket? Don't Speed*, Boulder Daily Camera, Dec. 9, 2008, at A6, *available at* 2008 WLNR 23577980; New York State Department of Motor Vehicles, *Speeding & Speed Limits Index & Overview*, http://www.nysgtsc.state.ny.us/spee-ndx.htm#slower (last visited Oct. 1, 2010) ("Always drive at or below the speed limit. If you choose to follow the crowd and travel at the same speed as everyone else, you could receive a ticket for speeding."). *But see* companion rule NYS Vehicle and Traffic Law section 1180(a) for an exception. The point is that determinacy in this context is not absolute, but *relatively more* determinate than other contexts.is not absolute, but *relatively more* determinate than other contexts.

[5] Many decisions of Constitutional law are notoriously difficult to predict, even for experts grappling with the same facts. *See* Andrew D. Martin et al., *Competing Approaches to Predicting Supreme Court Decision Making*, 2 Perspectives on Politics 761-68 (2004) (In one study, experts on constitutional law predicted outcomes of Supreme Court decisions at a 59% success rate, only a little better than chance. A probabilistic computer model bested the experts with a 75% success rate.).

[6] *See* Christopher Columbus Langdell, A Summary of the Law of Contracts 20-21 (2d ed. 1880) for a famous view of legal decisions as primarily formally derived. By contrast, *see* Jerome Frank, *What Courts Do In Fact*, 26 U. Ill. L. Rev. 645, 645-658 (1932). Frank and other realists have been caricatured as holding the view that legal decisions can be so indeterminate as to depend upon what a "judge had for breakfast." *See, e.g.*, Ronald Dworkin, Law's Empire 36 (1986). For the assertion that such a view from the legal realists was largely apocryphal rather

recognized the false dichotomy in such an approach.[7] It makes little sense to generalize about the overall determinacy of legal outcomes in the law. Rather, the determinacy of legal outcomes differs depending upon context.

That some legal outcomes *do* appear reasonably *ex ante*[8] determinate raises an interesting question: Are legal issues ever determinate enough to allow computers to analyze them? This prospect has long been alluring to intellectual inquiry.[9] As early as the seventeenth century, Gottfried Leibniz, the great mathematician and co-inventor of calculus, speculated that legal liability might be derivable through calculation.[10] Since that time, this notion – that legal determinations might be "calculable" and perhaps automatable – has continued to intrigue scholars in the computer science domain.[11]

Legal academics – to the extent they have addressed this issue – have tended to view the possibility of automated legal analysis with skepticism.[12] Scholars from the legal domain tend to insist upon a nuanced view of legal analysis. In this conception, legal reasoning is too imbued with uncertainty, ambiguity, judgment, and discretion to permit computerized assessment. This literature's common theme is that even if computers were technically able to mimic legal decision-making in a mechanical fashion

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than representative, *see* Brian Leiter, *Positivism, Formalism, Realism*, 99 Colum. L. Rev. 1138, 1148 (1999). *See also* Anthony D'Amato, *Can Any Legal Theory Constrain Any Judicial Decision?*, 43 U. Miami L. Rev. 513, 513-20 (1989).

[7] Lawrence B. Solum, *On the Indeterminacy Crisis: Critiquing Critical Dogma*, 54 U. Chi. L. Rev. 462, 470-73 (1987).

[8] Here, *ex ante* refers to a liability determination by a non-official legal actor, such as an attorney or layperson, *before* an authoritative legal decision-maker – such as a judge or administrative official – makes a binding determination about liability.

[9] *See, e.g.*, Virginia J. Wise, *Book Review: Modeling Legal Argument: Reasoning with Cases and Hypotheticals, by Kevin D. Ashley*, 5 Harv. J.L. & Tech. 245 (1991); Susan Haack, *On Logic in the Law: 'Something, But Not All'*, 20 Ratio Juris 1, 29 (2007).

[10] *See* Giovanni Sartor, A Treatise of Legal Philosophy and General Jurisprudence, Vol. 5: Legal Reasoning 389-90 (Enrico Pattaro ed., Springer 2005). Sir Matthew Hale, the Chief Justice of England, and Leibniz's 17th century contemporary, was skeptical of such an idea. *Id.*

[11] For examples of computer science articles studying whether aspects of law might be computable *see* Jeffrey Meldman, *A Structural Model for Computer-Aided Legal Analysis*, 6 Rutgers Computer & Tech. L.J. 27 (1977); Jon Bing, *Legal Norms, Discretionary Rules, and Computer Programs*, *in* Computer Science and Law (Bryan Niblett ed., 1980); Guido Governatori & Antonino Rotolo, *An Algorithm for Business Process Compliance*, *in* Legal Knowledge and Information Systems: Jurix 2008, 186 (2008); Ashley, *supra* note 8; Adam Wyner & Teveor Bench-Capon, *Argument Schemes for Legal Case-based Reasoning*, *in* Legal Knowledge and Information Systems: Jurix 2007, 139 (2007).

[12] Kevin Ashley et al., *Symposium: Legal Reasoning and Artificial Intelligence: How Computers Think Like Lawyers*, 8 U. Chi. L. Sch. Roundtable 1, 19 (2001) (Cass Sunstein argues that, "[A]t the present state of the art, artificial intelligence cannot engage in analogical reasoning or legal reasoning.").

they would necessarily miss the subtle institutional, value-based, experiential, justice-oriented, and public policy dimensions that are the heart of lawyerly analysis.[13]

It is interesting to note that, notwithstanding this view, computers *are* currently used to derive legal conclusions in some contexts. The widespread adoption of income tax preparation software such as TurboTax provides a familiar counter-example to the view of law as inherently unsuited to automated legal analysis. Such software contains a representation of the personal income tax code that has been formulated in a way that computers can understand. Supplied with "facts" by the user, the computer applies the laws to the facts using internal computer logic to generate legal conclusions. So good are these automated conclusions that the Internal Revenue Service, the definitive arbiter of liability in this context, routinely accepts them.[14]

With one example of automated legal analysis, it is tempting to dismiss the idea as idiosyncratically limited to the personal income tax context. However, multiple efforts to this effect from the public, private, and academic sectors suggest that a serious examination of this topic from legal scholars is overdue.[15] For example, the Federal Communications Commission (FCC) is investigating whether electronic devices can be made to automatically comply with government-issued spectrum management rules.[16] Similarly, the government of Singapore has explored the possibility of automatically assessing architectural building designs for compliance with building code laws.[17] Within the private sector, numerous corporations are investigating software aimed at automating business-compliance with health care,[18] privacy,[19] corporate,[20] and financial laws.[21]

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[13] Anthony D'Amato, *Can/Should Computers Replace Judges*, 11 Ga. L. Rev. 1277, 1277-81 (1977).

[14] *See, e.g.*, Internal Revenue Service, Corporate Returns, Forms 1120/1120S, http://www.irs.gov/efile/lists/0,,id=119096,00.html (last visited Feb. 18, 2010) (certifying tax preparation software providers).

[15] For an early, pioneering work in this area, *see* Richard Susskind, Expert Systems in Law: A Jurisprudential Inquiry 13-14 (1987).

[16] Notice of Proposed Rulemaking & Order, *In re Facilitating Opportunities for Flexible, Efficient, & Reliable Spectrum Use Employing Cognitive Radio Techs.*, No. 03-108, 2003 WL 23022050 (FCC Dec. 30, 2003).

[17] C. Eastman et al., *Automatic Rule-Based Checking of Building Designs*, 18 Automation in Construction 1011, 1017-18 (2009). Singapore was a pioneer in this area, *see* BCA/CORENET Website, http://www.corenet.gov.sg/ (last visited Jan. 18, 2010). Others initiating projects include the United States, Norway and Australia.

[18] *See* Symantec Corporation, The Importance of Automating Compliance, https://www.symantec.com/business/resources/articles/article.jsp?aid=20090224_the_importance_of_automating_compliance (last visited Jan. 18, 2010).

[19] *See* IBM Corporation, Compliance Management Solutions, http://www.ibm.com/software/tivoli/governance/security/compliance.html (last visited Jan. 18, 2010).

Within the academic realm, multiple projects are exploring automation in substantive areas as varied as intellectual property,[22] constitutional,[23] criminal,[24] and corporate law.

Despite these efforts, we cannot lightly dismiss the skepticism from the legal community about the plausibility of automating legal analysis. It is indeed hard to imagine a computer system satisfactorily adjudicating most disputes under the Free Speech Clause of the United States Constitution. How do we reconcile this skeptical view with the examples of automated legal reasoning systems that we actually see in practice? The answer ties back to this Article's opening theme. The automated legal reasoning systems that exist operate within particular legal contexts[25] in which legal decisions tend to be relatively more determinate.

Despite considerable attention to *indeterminacy,* legal scholars have devoted comparatively little attention to *determinacy* as a distinct jurisprudential topic.[26] Few articles have systematically considered the legal theoretical characteristics that allow for relatively determinate legal outcomes in particular contexts. This is understandable. In comparative terms, the number of legal contexts in which legal outcomes are tolerably

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[20] *See, e.g.*, Brightleaf Corporation, Brightleaf, http://www.brightleaf.com/ (last visited Feb. 5, 2010).

[21] *See* IBM Corporation, Business Rule Management Systems for Financial Markets, http://www.ibm.com/software/websphere/industries/financial/ (last visited Jan. 18, 2010).

[22] Stanford University, Stanford Intellectual Property Exchange, http://codex.stanford.edu/projects.html (last visited Jan. 18, 2010). *See also* the work of Elizabeth Gard at http://www.durationator.com/, formalizing the law of copyright term and duration in a software wizard (last visited Jan. 8 2011).

[23] Daniel J. Weitzner et al., Transparent Accountable Data Mining: New Strategies for Privacy Protection (2006), http://citeseerx.ist.psu.edu/viewdoc/summary?doi=?doi=10.1.1.128.1076 (last visited Jan. 18, 2010) (suggesting ways to technologically implement Fourth Amendment protections in privacy).

[24] Arno R. Lodder et al., *AI & Criminal Law: Past, Present & Future, in* Legal Knowledge Based Systems: Jurix 1998, 59-60 (1998).

[25] I use the term "legal context" in a particular way. I use it to refer to repeated, factual scenarios, under which actors in the legal system make legal determinations. For example, there is the "personal income tax" legal context, a reoccurring factual scenario in which actors make intermediate determinations about whether and how particular legal rules apply. They, for example, might make an intermediate determination about whether a particular expense qualifies as a deductible business expense under a particular rule, and ultimately, an overall determination about total personal income tax liability. Similarly, we have the "driving" legal context under the vehicular code, *see supra* note 3. I describe this further in part III.

[26] Major articles addressing the issue of determinacy directly are: Kent Greenawalt, *How Law Can Be Determinate*, 38 UCLA L. Rev. 1 (1990); Solum, *supra* note 6; and Ken Kress, *Legal Indeterminacy*, 77 Cal. L. Rev. 283 (1989).

determinate is probably somewhat small.[27] These contexts also tend to concern relatively mundane mechanical compliance on the part of lay-persons – e.g., subsets of rules found within the personal income tax code or building codes. Law, and by extension, legal scholarship, is more often concerned with the exercise of trained legal judgment in environments of uncertainty. From a scholarly perspective, relatively mechanical rules guiding quotidian compliance by laypersons may appear uninteresting as a topic for study.

I argue that there is something to be learned from studying these seemingly mundane subsets of determinate legal rules. Computer questions aside, there are larger lessons of legal theory to be gleaned by considering those conditions that enable relatively determinate legal outcomes. To that end, this Article provides a model for characterizing the relative degree of determinacy associated with given legal contexts. The inquiry is framed around the following question: what assumptions about the law, facts, and legal reasoning in a given context would have to hold for legal outcomes to be determinate enough to permit computerized resolution? Because computerized analysis is the very epitome of legal assessment based upon explicit, determined, and constrained mechanical inputs, framing the issue in this way not only addresses the practical automated legal analysis question but also places broader issues of jurisprudence concerning legal determinacy in sharp relief.

Part II anticipates the theoretical approach to the problem of determinacy and the automation of legal analysis with an informal, intuitive overview of the topic. This section describes the historically attractive parallel between mathematical and legal formalism that has led so many thinkers to the problem of the non-computability of law. In exploring the idea that legal determinacy varies contextually within the law, I informally hypothesize that our ability to usefully automate legal analysis is limited by considerations of indeterminacy in legal decision-making.

In Part III, I provide a theoretical model for characterizing the relative legal determinacy of legal outcomes in any given legal context. I consider a hypothetical model of legal decision-making in which legal outcomes would be *ex ante* determinable. I use this framing as a vehicle for identifying the assumptions about the law and about the process of decision-making that would have to hold in a given context in order to enable determinate legal outcomes. In this view, relative determinacy is a function of choice; it is dependent upon the constrained or flexible choices that are available to legal officials during the various phases of the legal decision-making process in any given context. Here, I borrow from a body of scholarship that has critically examined the role of choice in legal decision-making.[28] In articulating the various ways in which choice-based indeterminacy manifests itself during the stages of legal decision-making, these works

[27] Although the number of determinate legal contexts might be comparatively small, in absolute terms, the number is not insignificant given the large number of laws overall in society.

[28] Primarily, I draw from scholars emanating from the Legal Realist and Critical Legal Studies (CLS) traditions.

provide (perhaps unintentionally) a helpful taxonomy of the potential sources of *ex ante* uncertainty in the law. [29]

This Article's model characterizes relative *indeterminacy* through the lens of choice. Opportunities for choice appear at predictable and identifiable points of the legal decision-making process. Each discrete junction I label a *dimension of indeterminacy*. At each point at which a range of choices are available to a legal decision-maker – for example, which laws to apply and how to apply them – there will typically be an opportunity for uncertainty. Thus, the more choices available in a given context, the less *ex ante* certainty there will be about those considerations that a legal official[30] will ultimately bring to bear on a given legal decision, and consequentially, more uncertainty about ultimate the legal outcome.

We can use these observations that were developed to demonstrate *indeterminacy* in the law as a toolkit for identifying *determinacy* in the law. If indeterminacy is a function of choice, then determinacy depends upon the absence of choice. We know that choice is not always available to legal decision-makers in every context. Constrained by formal processes, explicit rules, the linguistic strictures of conceptually restrictive words, or by norms and policies of forbearance in crafting exceptions, exercising discretion or engaging in review, officials have comparatively fewer opportunities to exercise judgment in certain contexts. In those areas, there are explicit or implicit limits on the types of choices that might otherwise be available in other contexts. Sometimes these constraints work together to produce environments where determinate legal outcomes are not only possible, but also the norm. This is what I call the "variable determinacy thesis."

Part IV applies this thesis to the technical task of computationally modeling automated reasoning. What permits us to create usable computer models of legal outcomes in the Federal personal income tax context? It is a function of relative legal determinacy. The legal system has evolved a context in which the choices and arguments available to legal officials are, in that arena, relatively constrained.

In the personal income tax context, we can, for example, create reasonable computer models of the legal rules and factors that impact decision-making, because our system has restricted and reified the set of laws that are deemed to officially resolve outcomes in that context. We can be reasonably certain that in most instances liability will be governed by an *ex ante* fixed and determinable rule set of tax statutory provisions, regulations, and interpretations.[31] By contrast, we could imagine *ex post* legal officials routinely challenging lay reliance in assessing tax liability based upon such a fixed,

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[29] For the original inspiration for the idea of systematically categorizing the dimensions of indeterminacy listed in the CLS and legal realist scholarship, *see* Richard Fischl & Jeremy Paul, Getting to Maybe: How to Excel on Law School Exams (1999). Although this book modestly styles itself as a student study aid, I think it is one of the most important works of jurisprudence in recent years. *See also* Jeremy Paul, *A Bedtime Story*, 74 Va. L. Rev. 915 (1988), for an earlier take on this idea.

[30] By legal officials, I those who are, in any given context, deemed the official arbiters in resolving legal uncertainties, e.g., judges or administrative officials in some contexts.

[31] For example, the statutory provisions contained in positive sources such as Title 26 of the Federal Code.

positive, and constrained rule-set. But this would undermine certainty, and create indeterminacy about the governing legal rules. Instead, through informal and formal norms of forbearance and restraint in review, the legal system has created relative determinacy along one dimension of potential uncertainty. And, because there is a set of rules that can be, with confidence, specified and identified *ex ante*, we can, in turn, create accurate computer models of the substantive rules and factors implicated in legal decision-making in that context. Similar considerations of determinacy concerning other aspects of the legal decision-making process, limit our ability to usefully model legal outcomes in a given context.

In Part V, I raise a theory about how lawmakers can consciously calibrate the degree of determinacy in a legal context. I argue that they can often do this through the use of legal "meta-rules." Meta-rules are rules about rules.[32] In principle, lawmakers could adjust the expected determinacy of a legal context by providing *ex ante* meta-rules that explicitly constrain predictable points of indeterminacy. Using this Article's model, we not only have a means of *characterizing* the relative determinacy of existing legal contexts, but a view about how lawmakers might *create* new, more (or less) determinate legal contexts.

One reason that lawmakers might want to create relatively more determinate contexts is to make them more amenable to computation. As more regulable activities become electronically mediated, lawmakers will increasingly confront the prospect of automating aspects of legal compliance in those contexts. This model provides lawmakers with a framework for competently assessing the plausibility and trade-offs of such a decision. In many, if not most legal contexts, increased determinacy is not necessarily desirable due to well-known trade-offs in terms of regulatory flexibility, complexity, reductionism, fairness, and ability to achieve overall social goals.[33] However, in other select contexts, the ability of computable legal rules to act as a reasonable proxy for substantive regulatory goals will be acceptable due to efficiency and other benefits. I conclude by framing some of the normative questions raised by automated legal analysis, and the prospect of lawmakers intentionally increasing determinacy in particular legal contexts.[34]

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[32] H.L.A. Hart, The Concept of Law 77-90 (2d ed. 1994) (discussing law as the union of primary and secondary rules).

[33] A full exploration of the normative issues of automated legal analysis are beyond the scope of this piece. I hope to explore more thoroughly the normative consequences of formalizing and automating legal analysis in a future work.

[34] This Article should not be taken as an endorsement of automating legal analysis wherever theoretically possible. The normative issues, for example, whether it is a good idea to computerize areas of law even if possible, will be the subject of future scholarship.

II. IS IT POSSIBLE TO AUTOMATE LEGAL COMPLIANCE?

A. An Overview

It may strike some as odd to even consider automating legal analysis. After all, few issues seem so dependent upon the skills of trained professionals and so non-amenable to mechanistic processing as the assessment of liability under the law. Nonetheless, it is possible to automate legal analysis under some conditions. We know this because we have current examples in which conclusions about legal liability have been successfully automated within computer systems.

The best-known example of a comprehensive, and partially automated system for assessing liability in a substantive legal area comes from the domain of personal income tax law. In that area, software systems such as TurboTax employ deductive legal reasoning to arrive at substantive determinations as to liability under the personal income tax code. Such systems contain representations of portions of the personal income tax code translated into a form understandable by the computer. Supplied with legal "facts" from users and from other sources, the software applies the facts to the law to determine liability. Other examples of emerging systems engaging in rudimentary legal reasoning come from building law, vehicular law, and communications law, among others.[35] In short, contemporary computer systems like these can indeed come to legal conclusions under certain circumstances. This trend is already having a significant impact on the law and will increasingly become more important as regulable activities migrate into computerized environments.

That we have several operational examples in which legal analysis has been automated is important for several reasons. First, the ability to automate legal reasoning in some areas of law suggests the possibility of automating reasoning and compliance in others. Second, and perhaps more interesting, it appears to pose a challenge to a view from the legal domain that automating legal reasoning at any level of abstraction, is infeasible. At the very least, the presence of such exemplars suggests that we need a legal theoretical account as to why such systems are possible, and what their scope and limits might be. It is important to thus reconcile their existence, with the explicit and implicit skepticism from the legal theory scholarship doubting the possibility of automated legal analysis.

In that spirit, this piece aims to strike a pragmatic balance between the frequently optimistic proponents of automated legal analysis and the skeptics of this idea. That is, despite confidence from some members of the computer science community about the possibility of automating legal reasoning, it is important to confront the inherent limits to the determinability of legal outcomes that are endemic to the process of legal decision-making. These limits have not been realistically incorporated into the cross-disciplinary literature exploring this issue. To this end, I aim to employ well-understood concepts from legal theory to explain how limited automated legal analysis is consistent with the

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[35] *See, e.g*, BCA/CORENET Website - Home, http://www.corenet.gov.sg/ (last visited Jan. 18, 2010) (Singapore automated building code compliance site); Solibri, Solibri Model Checker, http://www.solibri.com/ (last visited Feb 18, 2010).

nuanced understanding of legal decision-making painted in contemporary legal scholarship. In particular, the Article approaches the issue cautiously under an overarching question: Is automated legal analysis possible throughout the law, or only in limited doctrinal areas, and why? In other words, is there something idiosyncratic about the personal income tax context that makes it uniquely amenable to computerized analysis, or can we extrapolate more broadly throughout the law?

My major claim is that contemporary computers can come to legal conclusions only in those contexts in which legal outcomes are relatively determinate.[36] This point is deceptively simple for several reasons. First, most of those who have considered the topic have not explicitly made this connection between the ability to automate the analysis of legal outcomes and *ex ante* determinacy.[37] This has led to a perception within the legal community that computer scientists have unrealistically over-claimed the potential scope of automated legal reasoning within the law.

Second, the concept of legal *determinacy* (as opposed to indeterminacy), has been comparatively underexplored in the legal literature. Thus, even if we make the connection between automating legal analysis and legal determinacy, we still do not have a robust vocabulary detailing what it means for a legal context to be *ex ante* determinate. I attempt to address this issue in Part III by providing a functional characterization of the concept of legal determinacy. Finally, there is the impression that mechanistic legal analysis necessarily implies simplistic legal analysis, can only be employed in mundane subsets of the law, or requires the development of computer technologies capable of exhibiting attorney level professional judgment. As I will argue, even in determinate contexts, there are applications of automated legal analysis that can produce results of surprising complexity, sophistication, and utility. Such useful and sophisticated resolution can occur without requiring the type of discretionary evaluation typically associated with the idea "legal analysis," which is beyond the technological capacity of typical contemporary computer systems.

At the core of this Article are a few broad ideas. First is the idea of that there are "legal contexts." Legal contexts are reoccurring and predictable factual scenarios in which actors within the legal system are routinely required to assess legal liability. The assessment of income tax liability under the personal income tax code is one example of a reoccurring "legal context." The second idea is that that the "amenability to

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[36] This is part of a larger point I am making explicitly linking "legal conclusions" and the relative determinacy of legal outcomes. To ask the question, "can a computer come to a legal conclusion," is to miss a crucial point – that we must first ask whether *anyone* can come to a legal "conclusion" (a highly *ex ante* certain outcome) in a given context. In other words, it is dependent upon whether legal decision-making is consistently determinate in that context. Only after we have established the relative determinacy of legal decision-making in that context, should we look to the next issue – whether computers – under existing technology – are able to come to legal conclusions in that context. I further argue that automated legal reasoning can typically occur, under contemporary technology, under a subset of contexts in which legal decisions are relatively determinate. That is, determinacy is a necessary, but not sufficient condition for automated legal reasoning. Particular determinate conditions must prevail.

[37] For an exception, *see* Richard Susskind, Expert Systems in Law: A Jurisprudential Inquiry (1987).

computation" of a legal context – the degree to which computer systems can be constructed to generate legal conclusions within that context -- is a function of identifiable legal theoretical characteristics about legal decision-making in *context*. In particular, the amenability to computation (in the way the term is used is this Article) is dependent upon how *ex ante* determinate legal outcomes tend to be within that context. The third idea is that determinacy among legal contexts is relative. The relative determinacy of legal outcomes is affected by multiple variables identified in this Article. Fourth, lawmakers can *consciously adjust* the degree of determinacy of legal outcomes in a given context. Finally, adjusting legal contexts to make them more determinate in particular ways can, in turn, make them more amenable to being automatically analyzed by computer systems (albeit with known tradeoffs).

1. The Problem of Legal Compliance

Firms and individuals exist within a complex legal regulatory environment.[38] To comply with the law in even a limited substantive area is often a complicated, uncertain, and expensive endeavor, even for sophisticated parties. Computers, on the other hand, excel at organizing, managing, analyzing, and processing information, even of substantial volume and complexity. For this reason, a branch of research within the computer science domain has been looking at this problem of complexity in complying with the law. This research asks: Can the information processing and analytical abilities of computers be harnessed towards the task of determining compliance and liability under the law?

Research into the possibility of automated legal analysis has been ongoing since the early 1960s.[39] Those who have explored this idea have done so in pursuit of several claimed advantages. The primary motivation from the private sector appears to be

[38] For example, as of 1997, a federal report estimated that the Code of Federal Regulations alone was over 130,000 pages long. *See* Office of Management and Budget, Executive Office of the President, Draft Report to Congress on the Costs and Benefits of Federal Regulations (1997), http://www.whitehouse.gov/omb/fedreg_rccb/ (last visited May 27, 2010). The total number of pages of all of the volumes of the unannotated 2009 U.S. Code numbers in the tens of thousands. *See* 2009 U.S.C. Repository, http://uscode.house.gov/pdf/2009/ (last visited Jul 6, 2010). How many laws are there in effect at any given time in the United States? It is difficult to come up with such an overall estimate as to the number of laws, even if we limit the inquiry into federal positive statutory law and regulation. Jurisprudential debates about what a "law" is, and the difficulty in dividing statutory codes into subsets that constitute standalone atomic "laws," for which there would be widespread agreement, make precise quantification difficult, if not impossible. Nonetheless, the above numbers make it possible to get some rough sense as to the magnitude of the number of existing, potentially applicable, federal legal obligations. Note that the above rough quantification only addresses the magnitude of the statutory and regulatory *federal* law, and does not even include the substantial additional legal obligations imposed at the state, local, and international levels, or those emanating from other non-statutory sources of legal authority or obligation.

[39] Layman E. Allen & Mary Ellen Caldwell, *Modern Logic and Judicial Decision Making: A Sketch of One View*, 28 Law & Contemp. Probs. 213-70 (1963).

increased efficiency. Corporations are attracted to the notion of using computers to lessen the various costs of complying with laws and regulations.[40] Other justifications include greater accessibility of the law to the public and improved transparency in legal decision-making.[41]

Before developing the thesis further, it is important to clarify a more basic issue that might not be obvious to those unfamiliar with the research in this area. What do scholars mean when they write of a "computer coming to legal conclusions" or describe "automated legal analysis?"[42] Does determining compliance with a law necessarily entail a sophisticated understanding of the meaning and dynamics of the legal system, or can useful work sometimes occur at a more basic level?

a. Overview of Automated Legal Analysis

"Legal informatics" is the collective name used to describe the field concerned with the use of computers and information technology within the legal system.[43] Legal informatics, however, is a general term, covering the multiplicity of ways in which computers are used in the law. This Article is concerned with a particular subset of legal informatics involving the "legally substantive" application of computer technology within the law. This section will provide a brief overview of the legally substantive/non-substantive distinction within the various uses of computer technology within the law.

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[40] *Id.* Some other justifications are worth mentioning. Some have argued that such systems will allow us to deal effectively with the increased complexity of regulation. Michael Genesereth, CodeX: Stanford Center for Computers and Law, Computational Law, http://codex.stanford.edu/background.html (last visited Feb 25, 2010).

[41] Other authors have argued that the integration of such systems within the legal system will allow us to achieve measurable societal benefits, including increased legal accessibility to underserved communities, improved transparency in legal decision-making, and increased clarity and predictability in the law. Similar strains of argument about increased accessibility to underserved communities are found in the legal scholarship as well. *See* Deborah L. Rhode, Access to Justice 190 (2004) (advocating for, among other things, increased automation for low income clients).

[42] *See e.g.*, G. Sartor, *A Formal Model of Legal Argumentation*, 7 Ratio Juris 177, 177–211 (1994); L. Karl Branting, *Building Explanations from Rules and Structured Cases*, 34 International Journal of Man-Machine Studies 797-837 (1991) ("[The computer program's] output is a memorandum that justifies a legal conclusion in terms of the applicable precedents and legal rules.").

[43] Simona Binazzi et al., *ITLaw: An Advanced Documentation System in Legal Informatics*, 1 J. Info. L. & Tech. (1999) http://text.www2.warwick.ac.uk/fac/soc/law/elj/jilt/1999_1/idg/binazzi/?external=true ("Legal informatics is, then, that science concerned with problems linked to the effective storage, retrieval and transmission of legal data; but it also deals, and from a slightly different perspective, with problems relating to the rationalization of legal activity; within this second grouping, the studies relating to formalization of the legal order.").

We can draw two broad categories of computer applications within the law: those that are principally concerned with the *substance* of the law, and those that are focused on organizing, managing, and retrieving legal information.[44] *Substantive* legal informatics aims to model the meaning and logic of laws in computer-understandable form. In other words, we deem a project "substantive" if it aims to represent the logic and meaning of legal rights and duties in computer systems. These substantive projects often (but not exclusively) employ formal, mathematically based, symbolic representations of the laws themselves and the various rights and duties that the laws create.[45]

We can contrast substantive projects against legal informatics projects that are non-substantive in nature. These non-substantive projects do not aim to convey to computers the underlying meaning of the law. Rather, such applications consist of the familiar uses of computers for organizing, sorting, and retrieving of legal data for presentation to and interpretation by attorneys and other legal users. Non-substantive tasks include: searching textual databases of laws such as Westlaw or Lexis-Nexis, analyzing empirical data, sorting and searching legal documents, e-discovery, engaging in statistical analysis, etc.[46] Importantly, in those examples, the *computer* does not have any "understanding" about the meaning or substance of the underlying law retrieved. Thus, we deem a project "substantive" only if the *computer* has been given an explicit, logical understanding of the rights/duties created by the law.

Since the substantive/non-substantive distinction is subtle, an example will help illustrate the principle. Let us imagine that an attorney retrieves the text of a speed limit statute using the computerized database such as Westlaw. Further imagine that this statute establishes a 65 mile per hour vehicular speed limit on highway driving.[47] Once retrieved, we assume that the *attorney* can read the statute and understand its underlying meaning. This is because the statute is written in English text, presumably with enough context to convey the meaning to the attorney. However, we would not say that the attorney's *computer* has any meaningful "understanding" about the substance or logic of the law it is displaying to the attorney. To the computer, the text of the statute is just a stream of data, without any particular information relating it to the real world or distinguishing it from any other stream of information. Without being given explicit context by a human in some sort of structured computer language, *ad hoc* information, such as written English text, is generally meaningless to computers. Thus, retrieval of the plain text of a statute by an attorney would be considered a non-substantive application of

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[44] *Id.* (The authors describe a similar distinction between "decisional informatics" in which the projects are concerned with the rationalization and computerization of legal decisions, and "documentary informatics," in which projects are concerned with researching and documenting the law. In this taxonomy, "substantive" informatics would be a subset of decisional informatics, as it is more concerned with the substance of legal decisions.).

[45] *See* Sartor, *supra* note 41, at 200-03.

[46] For an example of using legal informatics for organizational purposes, *see* Patricia Hassett, *Technology Time Capsule: What Does the Future Hold?*, 50 Syracuse L. Rev., 1223, 1231-33 (2000).

[47] *See, e.g.*, Cal. Veh. Code § 22349 (2009).

technology to the law. The attorney has used the computer system for the purposes of organizing and retrieving data that is meaningful to him but no effort has been expended conveying the meaning of the law in computer language. As counterintuitive as it sounds, we deem a legal informatics project substantive or non-substantive from the *perspective of the computer*.

Let's change the example slightly to illustrate what it would mean for a computer to have a rudimentary substantive understanding of the law. Suppose that it was somehow possible to convey the essential logic underlying the speeding restriction law to a computer. Imagine that the attorney, in consultation with a computer programmer, created a translation of the speed limit statute into a technical form capable of being understood by computers. The programmer creates a computer program that can accept numerical speed limits as an input. Imagine further, that the programmer designs a computerized rule telling the computer to flag all speed limits greater than 65 miles per hour as being in violation of the particular provision of the vehicular code.

In this way, we could deem the project substantive, because the computer had a more substantial "understanding" of the logic, and legal duties underlying the law. The computer now has a rule with the logic that speed limits above 65 miles per hour are deemed a violation of the legal duty created by the law. Let us suppose further that the computer had access to data about speed of particular vehicles on an actual highway. Perhaps we could even characterize the computer as being able to *apply* the law to the speed limit data, and arrive at *prima facie* legal conclusions about liability under the vehicle code. In other words, the substantive meaning of the text of the law has been translated into computer-understandable logic, and perhaps we might be justified in claiming that the computer has engaged in rudimentary, *prima-facie* automated legal analysis.

Why might we consider this automated legal *analysis* rather than non-legal "mechanical application" of the law? Because, in most instances, the process conducted by the computer will be approximately the same as the process engaged in by people – attorneys and lay persons – in this context. We would normally characterize an attorney assessing speeding liability in this context as engaging in basic, albeit mechanical, legal analysis. It is simply that, in this case, the legal analysis called for is not analogical in nature. Rather, prima facie legal analysis here mostly involves rudimentary mechanical or "deductive" reasoning. For now, let this intuitive example of a computer arriving at an automated, prima-facie legal conclusion suffice to illustrate the point.

Substantive legal informatics projects thus aim to create computer systems that can apply laws to particular factual circumstances, and derive substantive legal conclusions. Such projects are known as *automated legal reasoning* or *automated legal analysis* projects. In projects such as these, programmers attempt to convey the logic and meaning of the laws to computers, by translating the substance of the law into computer-understandable form. The process of imparting meaning to a computer system in structured, logical form, is often described as overlaying "semantic information."[48] Roughly speaking, the concept of a computer coming to an accurate legal conclusion suggests that the computer, after performing its own legal analysis, is able to reach the

[48] Stuart Russell & Peter Norvig, Artificial Intelligence: A Modern Approach 469 (3rd ed. 2010).

same conclusion that a *person* assessing liability would have come to.[49] Such a computer system is therefore assessing legal liability by engaging with the *substance* or *underlying meaning* of the law, hence, the synonymous phrase "automated legal analysis" or "automated legal reasoning."

First, I wish to make a preliminary cautionary note that it is important to take the terms computerized "knowledge" and "understanding" with a bit of caution. These terms are primarily meant as shorthand metaphors indicating the translating of the *logic of the law* to a form accessible to computer systems. They are not meant to imply contemporary technology endowing independent, human-like intelligence or professional judgment on the part of the computers.[50] Where we find a portion of the law – such as in the personal income tax context – in which we find computers regularly and successfully drawing conclusions based upon the substance of the law, I will refer to these contexts as "computable legal contexts" or "amenable to computation."[51] As I will argue later, the mere fact that resolution of a law does not require professional judgment does not necessarily imply that it will necessarily be incapable of regulating relatively sophisticated behaviors.

b. Motivations Behind Automated Legal Compliance Research

To those who have not pondered it, it is worth considering what trends are animating increased research into automating legal compliance.[52] A major change is the increase in activity by firms and individuals that is electronically mediated.[53] "Electronic mediation" refers to the idea that regulable interactions are increasingly occurring in electronic format, on networked computers, with the results of those interactions stored in databases. For example, contemporary firms and individuals routinely contract and

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[49] Although these topics are intimately related to relatively developed computer science topics such as Artificial Intelligence and Expert Systems, which are cited throughout this Article, I deliberately avoid the use of this terminology here, in that they can occasionally be misleading or suggestive of larger points not being made in this Article.

[50] It should be noted that part of the enterprise of the sub-discipline of computer science known as "Artificial Intelligence" (AI) does have as its goal simulating or replicating actual human intelligence. Moreover, the computer semantics and computer logic which I refer to through this Article are often considered within the sub-discipline of Artificial Intelligence. However, I make the distinction between the idea of "communicating the logic of the law to the computer" and the lofty goals of Artificial Intelligence, primarily for the purpose of not confusing my relatively simple theoretical points with the much further reaching goals of AI.

[51] For the idea of referring to these as computable or computational bodies of law, *see* Nathaniel Love & Michael Genesereth, *Computational Law*, Proceedings of the Tenth International Conference on Artificial Intelligence and Law, 205, 206-07 (2005).

[52] *See* Richard Susskind, The End of Lawyers 140-43 (2008), for a thoughtful discussion of this topic.

[53] Love & Genesereth, *supra* note 50, at 205-08.

purchase goods over the Internet through business-to-business transactions in which the entirety of the transaction is conducted electronically on computers.[54] The results of such interactions are typically stored electronically. Thus, more data about what has actually occurred in the real world is being stored online in structured databases, and is increasingly retrievable at a later time for *ad hoc* reference.[55]

Because of this increase in electronically-mediated activity, it is increasingly possible to apply and resolve substantive "elements" of legal rules electronically. For example, take the simplified scenario of a contract concerning the delivery of a purchased good.[56] Whether or not a delivery has occurred is a factual determination, and is resolvable in the sense that it is usually determinable by reference to particular types of external evidence.[57] In the above example, let's assume that the contract creates a legal obligation of payment, the resolution of which turns upon the actual delivery of the good to the purchaser. We might simplify the legal obligation in the following form, "If delivery occurs, then the legal obligation to pay begins." Since records of dispositive evidence are increasingly available and retrievable from online, structured[58] databases, computer systems are increasingly capable of automatically resolving foundational elements of legal rules.

To illustrate this point, let's first examines the resolution of this foundational factual element in the non-electronically mediated world. To resolve the contractual legal obligation we must first determine – from a legal perspective -- whether delivery has occurred. Let us assume, for the sake of the example, that the production of the relevant, signed paper delivery receipt will legally establish the resolution of the element of delivery, and that neither party will party will dispute the fact of delivery after visually verifying the date and signature information. In the non-electronically mediated world, the determination of this "legal fact" of delivery typically requires an inquiry into the records of the sending and receiving parties, often at considerable transaction cost. Individual employees at each party would commonly have to search through internal records, assert that a particular receipt is relevant to the transaction at hand, and send a copy of the documentary evidence of delivery and receipt to the other party.

By contrast, in our imagined electronically-mediated example, all of the stages of the transaction - the creation of the purchase and delivery obligation, and the record of

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[54] As of the first quarter of 2010, the total estimated e-commerce sales in the United States was over $38 billion. U.S. Census Bureau, Quarterly Retail E-Commerce Sales 1st Quarter 2010 (2010).

[55] *Id.*

[56] U.C.C. 2-507.

[57] Hans Kelsen, Pure Theory of Law 238-39 (2005) (the underlying assumption here is that the "natural fact" will likely become a "legal fact," to use Kelsen's terms, if it emerges from a typically uncontroverted authoritative source of facts.).

[58] To say that the data is "structured" is simply to say that the information about the delivery – such as date, time – are stored in an unambiguous form and have been properly classified in a computer database in this meaningful way.

delivery and receipt have been stored in structured databases, and available online. Thus, this *prima-facie* legal inquiry as to whether the delivery has been performed can be automatically resolved by a computer system with access to the database containing the authoritative records of the parties.[59] We have authenticated evidence of delivery – support for a foundational factual element of the governing legal rule – that is available in a form that computers can now automatically retrieve. Because the data is structured, the computer will be able to extract information such as the delivery date and signee. This is not to say that this evidence cannot be overcome with other evidence in some instances. But – just like physical copies of a delivery receipt – an electronic record of receipt will be strong *prima-facie* evidence of a foundational legal element of delivery. In most instances – just like a photocopy of a signed physical receipt submitted to evidence – we could imagine an authenticated electronic record of delivery as being dispositive on the legal issue of delivery.

Moreover, we could imagine emerging contracts *explicitly* contemplating within the body of the contract that the resolution of substantive legal obligations be determined electronically. In order to reduce transaction costs, both parties might explicitly agree within the contract that the legal fact of delivery is to be definitively resolved by reference to electronic records detailing some real-world occurrence. In that case, the electronic records would not simply be strong evidence of delivery; they would actually be – according to the substantive terms of the contract – legally dispositive on the issue of delivery.

Another example will further convey the point that data stored in structured databases is increasingly permitting the automated resolution of substantive elements of legal rules. Currently, the tax code treats "capital gains" differently from ordinary wage income.[60] Capital gains also receive different tax treatment depending upon time held, with long-term capital gains taxed at a lower rate. In order to apply the legal rule concerning the treatment of capital gains, one must first determine whether particular income is classified as a capital gain, and then, how long the underlying asset has been held. Most modern, sophisticated brokerage firms store data about customer investment gains in structured databases, keeping track of the type of asset that generated the gain, as well as the length of holding. Thus, when an individual must later apply the legal rule with the foundational "capital gains" element, computers are often automatically, and unambiguously, able to draw out data about investment income, including whether the income is considered a capital gain, and whether the capital gains have been held long enough for treatment at the lower tax rate.[61] As in the contract example, the increasing trend towards recording activity in structured, accessible databases in electronic environments is enabling simple automated legal determinations that previously required human intermediation. In short, the storage of accessible, structured data about real

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[59] Susskind, *supra* note 51, at 142-45.

[60] *See* I.R.C. § 1(h)(1)(C).

[61] Of course, the value of the data depends upon how reliably the legal assertion as to whether an investment is, or is not, a capital gain, is in the first place. This idea of a captured legal assertion is discussed *infra.*

world factual occurrences is reducing the transaction costs of resolving particular substantive elements within some legal rules.

Beyond electronic-mediated regulable activity and storage of structured data, there is a second technological trend enabling increased automation in legal compliance. This is the emerging tendency for manufacturers to include within common devices and products, sophisticated computer processors capable of engaging in logical reasoning, as well as data sensors which are able to extract data from the world. This trend is permitting finer-grained, and more efficient regulatory control of these objects in certain instances. An example of this can be found in so-called "cognitive radio" research.[62] Part of the goal of this research is to explore whether, for example, consumer electronic devices – can be made to automatically determine their own compliance according to FCC radio spectrum rules.[63] In short, it is increasingly becoming possible to embed the logic underlying particular legal rules within devices, and, in some instances, allow the devices to automatically analyze or alter their behavior to comport with these legal rules. These two major technological movements are among the most important factors enabling increased research into automation of legal analysis.

B. An Intuitive Approach to the Problem

It's helpful to proceed with a simple reframing of the overall problem – why *can't* we always automate legal analysis? What, if anything, is preventing computers from routinely coming to legal conclusions today in all areas of the law given the state of the art of contemporary computers? This is a question that has been thoughtfully posed by computer scientist Michael Genesereth and others.[64] No less than the eminent mathematician Gottfried Leibniz posed similar questions, not of computers, but of using mathematics and formal logic, in order to determine compliance with the law.[65] Other great thinkers including John Locke and John Austin advocated the use of formal mathematical reasoning to express and apply the law.[66]

As indicated above, in such a mixed computer-law question, there are both legal-theoretical and computer science-theoretical limitations that complicate the answer to this question. In this section I provide a more intuitive approach to the question of automated legal analysis that will anticipate some of the more theoretical issues that I raise later in this Article.

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[62] Roy Rubenstein, *Radios Get Smart*, IEEE Spectrum, Feb. 2007, http://spectrum.ieee.org/consumer-electronics/standards/radios-get-smart.

[63] *Id.* The Federal Communications Commission (FCC) has created the authoritative legal rules concerning which types of electronic devices may use which portions of the radio spectrum.

[64] Love & Genesereth, *supra* note 50.

[65] *See* Sartor, *supra* note 9, at 389-90.

[66] Thomas C. Grey, *Langdell's Orthodoxy*, 45 U. Pitt. L. Rev. 1, 16-18 (1983) (analogizing the classic legal science to Euclidean geometry).

1. Parallel Between Formality in Law and Formality in Computing

a. The Formal Structure of Computer Logic and Mathematics

It is worth exploring why computer scientists like Genesereth would even think to use computers to conduct substantive legal analysis. As many have noted, there is a very appealing parallel between formalist depictions of the law, which rely on structured legal form and deductive legal reasoning, and the underlying structure of computers – which are based upon mathematical and formal computer logic. It is this parallel between legal formalism and mathematical formalism that has long captivated thinkers such as Leibniz, into employing the principles of mathematics to bear upon legal analysis.[67]

The underlying structure of much of computing is based on the field of mathematical logic. Mathematical logic is the study of logical reasoning in which the formal rigor and symbolic precision of mathematics is employed. For those unacquainted with these ideas, I will provide a very brief, non-technical overview of the subject to convey the essence of the issue.

The early work of Aristotle provides a comprehensible and time-tested point of entry on the topic. Aristotle developed an early version of formal, logical reasoning which illustrates the same basic principle of deductive logic with us today. In Aristotle's classic conception of deductive logic, we have the three-part syllogism. The syllogism is composed of two premises – a general statement about the world, and then a specific assertion (often about a fact in the real world) covered by the general statement. Combining these two premises using deductive logic, one can arrive at a new conclusion, whose truth is guaranteed if the premises are true and correctly structured. For instance, using the classic example:

1) If all men are mortal;
2) and Socrates is a man;
   a. then we can conclude that
3) Socrates is a mortal.

In sum, Aristotle observed that you could separate the *form* of reasoning from its substantive content. What does it mean to separate form from content? In mathematics, algebra provides a familiar analogy. In algebra, specific numerals are replaced by variables, but the overall mathematical relationship of form is preserved despite the substitution of the variables. If one has two apples and one doubles that amount, one has four apples. If one has two of any regular unit and one doubles that amount, one has four of that thing, regardless of what that thing is. Algebra allowed the abstraction that relative mathematical quantity relationships persist – no matter what the particular object be it men or apples – we are actually referring to.

[67] Leibniz studied law at the university level, and was an accomplished legal thinker in addition to his well known mathematical contributions. *See* The Cambridge Companion to Leibniz, 20-22 (Nicholas Jolley ed., 1995).

There is an analogous interplay between form and substance in deductive logic. For example, the above syllogism could be replaced by symbols thereby retaining the *form* of the syllogism without altering its truth value

1) All A are B;
2) C is an A;
and the conclusion:
3) Since all A are B, and C is an A, therefore C is a B.

The abstraction means that the relationship holds beyond "mortals" and "Socrates" -- it does not matter what real world object you substitute for "A," "B" and "C." As long as the premises are true and the argument is properly formed, under deductive logic, the conclusion is guaranteed to be true.[68] In other words, we can learn about the truth of the conclusion based upon the *form* of the argument combined with the truth of the premises. Mathematical formality implies that there is a definite *structure* or *organization* present in the form, which is defined by rules.[69] This definiteness in terms of structure and process is the essence of what it means to be able to formalize a concept.

In modern times, mathematicians have created what might be thought of as very advanced variants of Aristotle's syllogistic logic, based upon formal mathematical foundations.[70] 19th century mathematicians observed that the syllogism could be reworked into more familiar, and easier to work with, but logically equivalent, "If-Then" rules. For example, the syllogism above can be reformulated as the logical equivalent:

1) If A then B (If a person is a *man* then he is *mortal)*
2) C is an "A"; (*Socrates* is a *man*)
3) Therefore "C" is "B." (Therefore *Socrates* is *mortal*) [71]

Because both formal logic and computer systems are based upon mathematical foundations, computer scientists are able to write computer programs that are capable of applying formal logical reasoning and coming to logical conclusions. These are known as rules-based automated reasoning systems. As a simple example, if we were to input into these systems the premises of Aristotle's syllogism – that Socrates was a man, and

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[68] If a logical argument is formulated in proper deductive form such that the truth of the premises guarantees the truth of its conclusion, it is said to be *valid*. When a logical argument is valid, and the premises are actually true, it is said to be *sound.*

[69] The mathematician George Boole was a pioneer in modern symbolic logic. George Boole, An Investigation of the Laws of Thought, 72-79 (1854).

[70] Aristotle's syllogisms were improved upon in the nineteenth century, leading to the development of Propositional Logic by pioneers George Boole and Gottlob Frege. More advanced and expressive logical variants, such as First Order Logic have since been developed. *See* Stuart Russell & Peter Norvig, Artificial Intelligence: A Modern Approach, 240-43 (3d. ed. 2010).

[71] Boole, *supra* note 68, at 175-86.

that all men are mortal – in technical form understandable by the computer – the computer system would be able, on its own, to conclude that "Socrates was a mortal." In recent years, computer scientists have created computer software capable of automatically resolving what amount to complex amalgamations of such "if-then" statements. These computer programs have proven to be extraordinarily good at analyzing vast amounts of complex if-then rules and their incredibly complicated interrelations.[72]

Why are such automated "if-then" resolvers useful? One of the benefits of formal, deductive reasoning is that one can deduce *unknown* truths "hidden" within existing information. Often there is useful information embedded within information that we already have, but it the complexity of the relationships make it to difficult to draw out the entrenched information.[73] To continue with our simple example, we might know that Socrates was a man, and that all men were mortal, but embedded in the combination of these two pieces of information was a *hidden* piece of information gleaned through deductive reasoning – namely, that Socrates was mortal. Without the power of connecting these disparate pieces of information, and applying the truth guarantees of logic, we may never have drawn out that conclusion. Such deduced knowledge is often non-obvious, and has value above and beyond that which was available by simply knowing the premises. Much of modern computational deductive reasoning is geared towards using the immense computational power of computers to draw out non-obvious, embedded information in a way that would be impossible for unassisted humans.

So good are computers today at manipulating formal logical rules, that computer scientists have developed rules-based "automated theorem-prover" systems in which computers have been able to solve complicated mathematical and industrial problems too complex for human analysis.[74] In short, computers today are extremely good – much better than people – at automatically analyzing if-then rules. Moreover, mathematicians have developed logical forms far more advanced than the simple "if-then" based logics of the earliest decades.[75] These highly expressive logical languages are capable of representing highly complex objects in the real world and their properties and interrelationships.[76]

Given this confluence – the development of highly expressive formal mathematical rule languages that are capable of being understood by computers and computer systems that are excellent at rapidly manipulating these rules and determining the consequences of their application, it was a natural step to conceive of applying these

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[72] *See* Russell & Norvig, *supra* note 69, at 295 ("[Automated] theorem provers have been applied widely to derive mathematical theorems, including several for which no proof was known previously.").

[73] Susan Haack, *On Logic in the Law: 'Something, But Not All'*, 20 Ratio Juris 1, 10-11 (2007).

[74] *Id.*

[75] For an overview of First Order Logic, see Russell & Norvig, *supra* note 69, at 240-68.

[76] Haack, *supra* note 72, at 10-13.

technologies to the law. Why? Because in many conceptions of the law, there is a logical structure at its heart – not unlike the series of "if-then" rules that computers have become so adept at analyzing.

b. The Formal Structure Of Law

What has motivated contemporary theorists to explore the parallels between formal mathematical logic and the law?[77] No doubt that it is due to the numerous formal elements present within the modern legal system. These formal legal elements parallel, at least at on a superficial level, some of the mathematically formal logical structures that are processable by contemporary computer systems. Because there are high-level similarities between the formal aspects of the law and the formal mathematical models in automated reasoning computer systems, there has been a particular allure to the idea that legal analysis could be automated.

To illustrate this parallel, it is helpful to briefly survey some of the major formal features of American law. The first formal characteristic present in the law relates to the fact we refer to the law as if it is *structured* organizationally – at least at some high level of abstraction. [78] True, many have contested particular structures within the law, and debated its content.[79] But at the very highest level, in a very practical sense, there is thought to be is at least superficial structure within the organization of law as a group of rules and doctrines organized by topic.[80] For instance, laws are generally categorized into large bodies or areas of law such as "tort law" or "anti-trust" or "constitutional" law. Bodies of law are in turn grouped into subtopics within a given area. That there is a formal structure to the organization of the law is most apparent in modern statutory schemes. In these realms, legislation is typically organized into formal sections and sub-sections and paragraphs. However, even outside statutory law, we see formal organization. Judges characterize different cases as dealing with different statutory or common law doctrines, and position judge-made rules into particular categories of the

[77] Perhaps earlier theorists such as Locke and Leibniz were motivated by formal elements of the law of their time; it is not clear. Anecdotally, it seems that law was less formal in terms of structure and formal hierarchy of law than it is today, in the modern statutory state.

[78] Ernest J. Weinrib, *Legal Formalism: On the Immanent Rationality of Law*, 97 Yale L.J. 949, 951 (1988) (noting that "legal activity invariably takes place within some structure, however lax").

[79] Chaim Saiman, *Restating Restitution: A Case of Contemporary Common Law Conceptualism*, 52 Vill. L. Rev. 487, 487-89 (2007) (discussing the attack on common law conceptualism by legal realists).

[80] *See, e.g.*, Frank, *supra* note 5.

area of law the rule is meant to be part of.[81] This categorization and typing is a feature of formality.[82]

We also see formal structure within the composition of individual legal obligations. Laws are frequently phrased in the declarative form, and can typically broken down into logically distinct, substantive elements. Law students are taught such a logically structured approach to the law in terms of finding rules within bodies of law, and then breaking down rules into their composite elements.

Within this structural view, similarities between mathematical formalism and legal formalism begin to emerge. Importantly, most laws can be reformulated into a logically equivalent "If-Then" formulation.[83] For example, let us take once again a vehicular speed limit statute. Imagine this statute says: "No person may drive a motor vehicle upon a highway at a speed greater than 65 miles per hour."[84] This law can be converted into a logically equivalent statement that says, "If one is *driving a vehicle upon a highway at a speed greater than 65 miles per hour* Then this will result in a *violation of the vehicular code*." As indicated previously, these "If-Then" rules are precisely the type of statement that can be converted into formal mathematical logic – the language of computers – and inputted and processed by rules-based automated reasoning systems.

In another parallel, the overall framework for legal *decision-making* is often presented in terms of deductive "If-Then" style of logical reasoning.[85] Often the mode of general legal reasoning leading to legal outcomes is characterized as proceeding through the structure of the "legal syllogism."[86] In terms of assessing liability, the basic framework in processing the legal syllogism is often depicted as follows: find the law, compare the law to a given factual situation, and if the law applies, use deductive logic to derive the legal result.[87]

For example, determining whether a speeding violation has occurred usually requires, at some level, 1) Taking the general rule, "If *driving a vehicle upon a California highway at a speed greater than 65 miles per hour* Then *violation of the vehicle code."*

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[81] Pierre Schlag, *The Aesthetics of American Law,* 115 Harv. L. Rev. 1047, 1055 (2002).

[82] *See* Morton J. Horwitz, The Transformation of American Law 199-200 (1992).

[83] Ward Farnsworth, The Legal Analyst: A Toolkit for Thinking About the Law 164 (2007) ("Most laws – whether made by legislatures, courts, agencies, or anyone else – can be understood as if-then statements.").

[84] Cal Veh. Code § 22349(a) (West 2000).

[85] Farnsworth, *supra* note 82 (2007).

[86] Paul E. Treusch, *The Syllogism*, *in* Readings in Jurisprudence 539 (Jerome Hall ed., 1938).

[87] *See* Torben Spaak, *Deduction, Legal Reasoning, and the Rule of Law*, 23 Const. Comment. 121 (2006) (summarizing legal philosopher Neil MacCormick's view of legal reasoning as "essentially applying rules to facts" and suggesting that MacCormick viewed the legal syllogism as having upmost importance in legal reasoning); *see also* Neil MacCormick, Legal Reasoning and Legal Theory (1994).

2) Taking a particular factual situation – person X was driving his car on California Highway 101 and was measured as traveling at 90 miles per hour. And then 3) Applying deductive logic to see if the specific instance matches the general description of the rule, to see if a violation has occurred. This is the same procedure that was illustrated in deductive logic context, when we saw the structure: If X Then Y, X, therefore Y.

Even when legal decision-makers such as judges engage in analogical reasoning or instrumental balancing to come to a result, they are frequently portraying their analysis within the overall deductively structured framework. For example, a high level formalized simplification of the tort doctrine of negligence might be

> "If *Duty and Breach*
> *and Causation* and
> *No Defenses*
> Then
> *Liability Under Negligence*."

When courts engage in analogical reasoning about whether the defendant did or did not exhibit the requisite care under the breach element of the doctrine of negligence, they still proceed through the structured, formal framework of elements to be analyzed.

Given that most laws can be formulated into if-then statements, and that much of legal decision-making is characterized, at a high level, in terms of deductive structure, we can begin to see the natural appeal between computerized automated reasoning systems – which take complicated "if-then" rules and analyze them applying deductive logic – and the law. Of course, it's worth noting that our modern law's similarly formalist structure is no coincidence. The legal formalist thinkers of the early 20th century, were called "formalist," precisely because they attempted to apply the mathematically formal techniques of science and logic and organization within the law.[88] At least at the organizational level, their influence still remains.

C. A Thought Experiment for Understanding the Problem

Now that we've established that there are at least superficial similarities between formal elements within the law and the mathematical formalism of computerized reasoning systems, we can see why there is an attraction to the idea of "computing the law." Despite this attraction, there are reasons to think that such an idea may be harder than it appears at first blush. In this section, we'll engage in a thought experiment to help us understand the problems at an intuitive level.

Let us return to the original question – what is preventing a computer from engaging in legal analysis today in every area of the law? Two competing visions of the law, at conceptually opposite ends of the spectrum will help highlight the issues involved. In order to highlight my point, I will offer somewhat oversimplified views of both positions that I am discussing.

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[88] *See* Horowitz, *supra* note 81.

1. The View of the Law as Principally Computable

At one end of the spectrum we see a vision of the law advanced by computer science professors and mathematicians such as Michael Genesereth.[89] In a rough version of this view of the law, the law should be, in principle, entirely computable from a legal substantive standpoint. Imagine that we would like to determine legal liability in a given factual situation or legal context. The determination of liability in many or most cases should, under this view, simply involve the finding of the relevant legal rules, the finding of the relevant facts under these laws, and then inputting this information into a computer system in a way that is formulated for the formal language of the automated reasoning systems. Such computer systems would then apply the rules of formal logic using automated reasoning software and return the results. The resulting output which would be an assessment of legal liability under the circumstances, based upon the rules formulated in computer logic, and the "facts" inputted in an unambiguous format. We can term this the "rules-centric" view of legal decision-making.

In principle, some computer scientists wonder why many if not most legal determinations should be capable of being ascertained this way.[90] Those who adopt this view see the inability to automate legal analysis widely throughout the law as primarily a problem of the various ambiguities that are prevalent within the law as it currently exists. The problem, according to these scholars, is that law is written primarily by lawyers, and not those trained in the rigors of formal logic.[91] This is similar to the critiques of the imprecision, ambiguity, and vagueness of the law advanced by Liebnitz[92] many years ago. Strong strains of this view can also be found within legal scholarship by some of the early legal formalist scholars.[93] This is by no means an unusual view of legal decision-making from those outside the legal profession. [94]

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89 Love & Genesereth, *supra* note 50, at 205-09.

90 *Id.*

91 Layman Allen, *Symbolic Logic: A Razor-Edged Tool For Drafting and Interpreting Legal Documents*, 66 Yale L.J. 833 (1957).

92 *See See* Sartor, *supra* note 9, at 389-90 ("[T]he young Leibniz proposed the transposition of the axiomatic approach to law by expressing the legal system in a few propositions, from which all legal conclusions could be 'geometrically' derived.").

93 *See* Grey, *supra* note 65.

94 We see strains of this position in occasional popular laments to replace judges, who are susceptible to biases, with "objective" computers. *See* Bettijane Levine, *Judging the Judges*, L.A. Times, Apr. 9, 1997, at 1, available at http://articles.latimes.com/1997-04-09/news/ls-46727_1_county-judge ("Barbara Swist, founder and executive director of Consumers for Legal Reform in Costa Mesa … would also like to see computers replace judges in some civil matters.").

2. The View of the Law as Largely Indeterminate

At the other end of the spectrum, we see a view of the law advanced by scholars who I will refer to as the "anti-formalists." These are primarily scholars of the Legal Realist and Critical Legal Studies tradition.[95] Many of them see the law as fraught with indeterminacies – or uncertain elements that cannot be precisely pinned down prior to official determination during litigation. This is in contrast to "rule-centric" view of Leibnitz and Genesereth. The "anti-formalist" view is sometimes described as a form of "rule skepticism."[96]

Under the strong view of legal indeterminacy, the law is often seen as so fraught with inherent uncertainty, arbitrariness, judgment, and unpredictability that it would be difficult for a person (or a computer) to routinely come to anything resembling the *ex ante*, deductively derived, legal conclusions suggested by the rules-centric model.[97] Legal analysis, according to this position, involves a nuanced mix of factors, and requires taking into account institutional dynamics, judicial choice, interest-balancing, public policy, ideology, and social norms. According to this view, not only are deductive rules inadequate to capture the full range of the subtle features relevant to legal decision-making, such decisions do not actually depend upon formal deductive reasoning involving formal legal rules. This view also challenges a major premise to Genesereth's, which takes the *inputs* to the legal reasoning process as decidable and reified.

3. Mixed Results in Many Computerized Reasoning Projects

The tension between these polar views of legal decision-making helps illustrate the limited success of actual automated legal reasoning systems. Despite a number of attempts to implement the idea of automated legal reasoning, there have been decidedly mixed results in practice. L. Thorne McCarty's pioneering advocacy in the late 1970's for using computerized reasoning systems to assist in assessing liability under the tax code was among the early successes. [98] McCarty's intuition was ultimately borne out, as we now routinely see personal income tax software, such as TurboTax, used in order to compute legal liability under the personal income tax code.

However, there have been a number of other projects that, while fascinating from a theoretical level, have not gained traction in the real world. For example, mathematician Robert Kowalski and others famously attempted to convert British

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[95] Wilfrid E. Rumble, Jr., American Legal Realism 36 (1968).

[96] Karl N. Llewellyn, *Some Realism About Realism: Responding to Dean Pound*, 44 Harv. L. Rev. 1222, 1222-24 (1931).

[97] *See* Solum, *supra* note 6, at 464. Lawrence Solum has termed the view of the law in which it is seen as primarily indeterminate the "strong indeterminacy" view, and a lesser view of the law in which it is seen as frequently indeterminate, the "weak indeterminacy" view.

[98] L. Thorne McCarty, *TaxMan: An Experiment in Artificial Intelligence and Legal Reasoning*, 90 Harv. L. Rev. 837 (1977).

legislation governing British citizenship into a logic-based computer program, but encountered several problems of ambiguity and irresolvable competing issues of public policy.[99] Other projects involving attempts to translate the substance of actual statutory legislation into computerized code, have run into similar problems. I argue that at least part of discrepancy between those that have largely succeeded, and those that have not, is due to a lack of a coherent legal theoretical framework for understanding which portions of the law are likely to be amenable to computerized substantive analysis.

Intuitive Understanding as to Why This is a Hard Problem at all

One way of understanding the limited success of automated legal reasoning systems is to conclude that the rules-centric view, upon which such systems are premised, provides an incomplete account of legal decision-making. To make this point, I will present a simplified overview of the standard critique of the rules-centric view.

H. L. A Hart provides the classic demonstration of the descriptive limits of a rules-centric view of legal-decision-making. Hart asks us to consider a statute that states, "No vehicles are allowed in the park."[100] Under the lay, rules-centric view of legal decision-making, we might imagine that determining violations of this law would be fairly straightforward.[101] To assess violations of this statute would be simply a matter of applying the text of the law to the facts – in this case examining what is entering the park and deciding whether it is within the prohibited class of "vehicles."

However, as Hart shows, the apparent simplicity of deductive legal analysis, even under such a seemingly elementary rule, can be deceptive.[102] For example, we might inquire if a person riding a bicycle in the park is violating the law? Most people would agree that the bicycle is likely a "vehicle," but would simultaneously wonder whether that was the type of vehicle – likely *motor* vehicles—that the statute aimed to prohibit. Similarly, let us take the example of an ambulance driving through the park to rescue an injured citizen. Again, most people would view this as a literal violation, since an

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[99] *See* M.J. Sergot et al., The British Nationality Act as a Logic Program, in 29 Comm of the ACM 370 (1986).

[100] H.L.A. Hart, *Positivism and the Separation of Law and Morals*, 71 Harv. L. Rev. 593, 607 (1958).

[101] *See* Frederick Schauer, Thinking Like a Lawyer 13 (2009) ("A widespread popular conception has it that . . . judges make their decisions by consulting books full of . . . rules. Having found the right rule . . . the judge proceeds to apply it mechanically to the case at hand, and that is the end of the matter.").

[102] Take for example, the situation in which a person is walking through the park. Is this a violation of the law? It's hard to make a plausible case that a walking person qualifies as a "vehicle." Let's take another example of a car driving through the park. Is this a violation of the law? It is hard to make a plausible case that an automobile is not a vehicle as commonly understood. In principle, it seems that they lay view is correct and that there is nothing being done here in the adjudication of liability that computers couldn't, in principle, also do.

ambulance is motor vehicle, yet they would intuitively think that there was likely an unstated exception for official emergency vehicles.

The "no vehicles in the park" rule initially appeared to be fairly straightforward to apply. Yet, a series of atypical facts produced unacceptable results when we employed strict deductive logic. We can imagine that legal analysis becomes only more complicated in areas of law where the legal rules do not appear, even superficially, to be straightforward. For example, provisions within U.S. Constitutional law frequently contain legal criteria that involve open-ended judgment. The Supreme Court has ruled that schools can regulate school-sponsored speech "so long as their actions are reasonably related to legitimate pedagogical concerns."[103] It would be hard to imagine a computerized legal reasoning system, employing only deductive reasoning, reaching a satisfactory legal determination (or any determination at all) as to whether a pedagogical concern is "legitimate" under First Amendment jurisprudence.

D. Skepticism of a Rules-Centric/Formal View of the Law

The point of the Hart example was to highlight that the rules-centric/formalist view of legal decision-making has easily identifiable limitations as a descriptive model. Such illustrations undermine claims of the overall *ex ante* determinability of legal decisions, and the degree to which the text of statutes themselves can be widely and deductively dispositive.

Hart's critique parallels a shift in American legal thought over the last one hundred years away from formal, rules-centric views of legal decision-making. Today, the dominant view in American legal thought is decidedly (and justifiably) rule-skeptical. This skepticism is a partially a reaction to over-claiming by Legal Formalist scholars concerning the determinacy and rules-centric nature of legal decision-making.[104] According to the standard account of this transformation, in the early part of the 20th century, scholars from within the Legal Formalist tradition proffered a view in which legal outcomes were entirely the result of mechanical, deductive logical reasoning on the part of judges. In that perspective, judges arrived at legal conclusions solely by identifying and applying legal rules to objective facts.[105] A subsequent generation of scholars from the Legal Realist tradition strongly critiqued the formalist view as naïve, inaccurate, and non-descriptive of actual legal decision-making. In the wake of these criticisms, most mainstream scholars soon discarded the early Legal Formalist position as a non-viable view of legal decision-making.

The modern view of legal analysis is now indelibly infused with the insights and skepticism from the Legal Realists.[106] This rule-skeptical theme was picked up and

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[103] *See* Hazelwood Sch. Dist. v. Kuhlmeier, 484 U.S. 260, 264 (1988).

[104] Mine is a vastly oversimplifed account. For a more complete account, *see* Pierre Schlag, *Formalism and Realism in Ruins (Mapping the Logics of Collapse)*, 95 Iowa L. Rev. 195 (2009).

[105] *Id.*

[106] Joseph William Singer, *Review: Legal Realism Now Legal Realism at Yale: 1927-1960,*

vastly expanded by Critical Legal Studies scholars beginning in the 1970s. Consequently, today, the formalist view of the law – as closed, formal and rule-centric – is used as a foil and is quickly dismantled during the typical first year of law school.[107] While legal decision-making appears to entering students as simple matter of judicial automatons applying laws to facts – something that could be readily replicated in a computer in the lay conception – the process appears distinctly more complex after legal training.[108] Moreover, law training emphasizes that the rules-centric view glosses over important nuances about the role of the legal system in society. In the rules-centric view, an official's role is limited to the determination of objectively correct legal answers. By contrast, students learn that many, perhaps most, legal cases represent true societal disputes. In that position, officials are not determining objective answers, but rather, serving the functional role of conclusively electing between the reasonable but conflicting legal rights and interests of different entities in society.

It has largely been beneficial that the Legal Realist view has come to dominate American legal thought. The dismantling of the implausible over-claiming by legal formalists as to the extent of determinacy in the law has led to a more nuanced model as to how legal outcomes come about. However, there has been one negative side effect of the dominant realist view. This shift has caused legal scholars to overlook, and perhaps dismiss, those limited contexts in which the rules-centric description is actually apt.

Since the very essence of modern, American law school education involves the inculcation of judgment, analysis, and argument in environments of legal uncertainty, such perspective tends to cause legally trained individuals to overlook the more modest claim that some, small subsets of legal decisions are actually relatively determinate.[109] This view contributes to the perception that automated computerized legal reasoning systems are unrealistic, because the term "legal analysis" often brings to mind the more nuanced type of reasoning employed in environments of legal uncertainty routinely employed by professional attorneys.

But focusing on the issue in terms of the question suggested by that view – "Can computers come to legal conclusions or engage in legal analysis?" – is possibly confusing in two ways. It distracts us from the point that, in many respects, this has nothing to do with the question of legal decision-making specific to computers. A formal legal analysis, involving facts, using formal deductive reasoning, should be the same whether conducted by *computer* or *lawyer*. The relevant question is not, can *computers* come to legal conclusions, but is actually can *anybody* come to *ex ante* legal conclusions? In other

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76 Cal. L. Rev. 465 (1988) (arguing that "We are all realists now."); J.M. Balkin, *Some Realism About Pluralism: Legal Realist Approaches to the First Amendment*, 375 Duke L.J. (1990) (describing a common view that when it comes to analysis of Constitutional law, that a legal realist approach is taken).

[107] *See* Schauer, *supra* note 100.

[108] It's probably a fair characterization to say that the general view within the legal academia and practice today that legal decisions are not determinate. It is unlikely if any American law professors today would take the early legal formalist position that legal decisions are always or largely *determinate*, and are usually the product of mechanized reasoning.

[109] Fischl and Paul, *supra* at note 28.

words, are there parts of the law where one can come to a definitive legal conclusion *ex ante*, or is everything hopelessly indeterminate until resolved by an official?[110] Is the law composed solely of educated guesses and hedges by lawyers and lay-people, or is there a realm of approximate legal certainty in prediction that could be properly characterized as an *ex ante* legal conclusion?[111] Larry Solum, Kent Greenawalt and others have provided theoretical footing for the proposition that legal decisions need not be insolubly indeterminate.[112]

In the next section, I will explore the features that contribute to decisions in a legal context being relatively more determinate, and explore why certain aspects of determinacy render a context more amenable to computation. In short, if we take legal indeterminacy to mean *ex ante* unpredictability about legal outcomes, we can explore the various sources that contribute to the indeterminacy. For example, one source of indeterminacy concerns *ex ante* uncertainty about which laws, facts, and other considerations will be brought to bear in the ultimately analysis of liability. This is reflective of the insight that many of the inputs to the legal process do not in fact become determined – until a later date in the future – when some official– a judge or finder of fact – makes this decision. In other words, the applicable law may be a true unknown *ex ante* – subject to determination in the future. A legal outcome will be unsuited to deductive reasoning when the applicable laws and facts that we input to the system are themselves uncertain and unknown *ex ante*.

The counterpoint is that, if there actually are legal contexts that share some of the features of formalist, rules-centric views of legal decision-making – we might imagine that the particular decisions in those contexts will be incrementally more amenable to computational analysis. We might say that such contexts exhibit "practical determinacy," and suggest that the personal income tax context exemplifies such a context. The personal income tax context is not *perfectly determinate*. But it is relatively more determinate along several potential dimensions of uncertainty than other contexts – so much so that the indeterminacy can be relatively cabined and formalized and modeled in a computer system. Thus, that existing automated legal reasoning systems have seen only limited success is not necessarily about the complete failure of the rules-centric view of legal decision-making. Rather, it is more likely a story about computationally modeling the *wrong types* of laws.

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[110] Jules Coleman & Brian Leiter, *Determinacy, Objectivity, and Authority*, 142 U. Pa. L. Rev. 549, 559 (1993) ("The question about metaphysical objectivity . . . is . . . whether [legal facts] hold . . . independently of what all lawyers and judges would think.").

[111] *See*, *supra* note 25, making this point about the possibility of objectivity and *ex ante* legal "conclusions" in the law.

[112] Solum, *supra* note 6, Greenawalt, *supra* note 25.

III. CHARACTERIZING LEGAL DETERMINACY

A. A More Rigorous View of Legal Determinacy

A primary theme of this Article is that under a certain subset of legal conditions – many of which are associated in the legal scholarship with the concept of "legal determinacy" – we can employ computers to come to legal conclusions. In other words, the extent to which we can employ computers to assess liability in particular contexts will depend on the degree to which outcomes in that legal context are relatively determinate in certain ways. The outcomes that I am exploring are all connected to *deductive* legal determinacy – which can be thought of as just one part of the general concept of constrained predictability.

In the previous section, we examined this concept of relative determinacy in an informal, intuitive fashion. The intuition was that the personal income tax context was relatively determinate by some measures. I hypothesized that various aspects of this determinacy permitted computerized analysis.

In this section, I develop a model that aims to capture the idea of legal determinacy more rigorously. Such a model will allow us to identify that subset of legal conditions that permit computability. One way of generating determinate legal outcomes – there are perhaps others – is to have official legal decision-making occur according to a pre-determined, rule-bound process. If there is an *ex ante* determinable set of rules, and if legal decision-making by authoritative officials actually proceeds according to those rules, and if the application of those rules is constrained under various conditions, we might characterize legal outcomes under these circumstances as being relatively more determinate.

It would be helpful to have a means to carefully express the relative degree of legal determinacy and indeterminacy in differing legal contexts. To this end, I will argue that the determinacy of legal outcomes in a given context can be best considered through the framework of the choices available to officials during the legal decision-making process. These choices occur along every step of the legal decision-making process and most of them represent predictable types of decisions. They are decisions, for example, about what laws and other considerations to use in decision-making, and how to apply them. Importantly, relative determinacy will depend upon the extent to which the decision-maker's choices are limited in a particular context due to constraints.

We can use these decision-points, or choice-points, as a vocabulary for characterizing the relative degree of legal determinacy in a given context – i.e., think of these choice-points as "dimensions of potential indeterminacy." My major claim will thus be that legal determinacy is a quality that must be assessed along these multiple dimensions, and my task will be to articulate those dimensions. The more constrained legal decision-making is in a given context along these dimensions, the more determinate we say that context is. Before moving to the heart of the model proposed here, I will address some threshold topics concerning my usage of the terms "legal analysis" and "legal determinacy" that will aid the reader in understanding the thesis.

1. Legal Analysis, Outcomes, and Conclusions

What does it mean for an attorney or computer to "come to a legal conclusion?" This Article uses several concepts interchangeably – legal analysis, legal assessment, liability assessment, determining legal outcomes or conclusions. It is important to clarify my usage of these terms. At a high level, these concepts share the same core idea – whether there is an "objective"[113] (as opposed to persuasive) assessment about whether a particular set of facts implicates the law, and the likely consequences of such implication.

As Oliver Wendell Holmes famously noted, legal analysis is ultimately an unofficial prognostication conjectured from the point of view of an official legal decision-maker.[114] Holmes said that "a legal duty…is nothing but a prediction that if a man does or omits certain things he will be made to suffer in this or that way by judgment of the court."[115] Embedded in this observation are three distinct concepts that I will disentangle: 1) Legal analysis varying with the perspective of who is doing it (e.g., officials or non-officials); 2) Legal analysis as a concrete determination or a probabilistic prediction; 3) The likelihood of enforcement and consequences.

Legal analysis, as a process, has different implications depending upon which type of legal actor is performing it. We can distinguish two broad categories of legal actors: those who are official arbiters of the law, and those non-officials who are regulated by the law. The official arbiters of the law are those legal authorities, most commonly judges or regulators (although sometimes juries play this role), who have the official capacity *to resolve* legal uncertainties, and to officially determine legal liability. Those regulated by the law most commonly include individuals, and corporate and government entities.

Because of their ability to officially and definitively resolve legal uncertainties, we can think of judges and other official arbiters as engaging in the process of making legal determinations or coming to legal conclusions. Official arbiters can resolve intermediate legal issues, as well as arrive at ultimate decisions of liability. By contrast, regulated legal actors can typically only come to probabilistic predictions about intermediate legal issues, or ultimate questions of liability. Their assessments can be thought of, as Judge Holmes aptly noted, as forecasts about likely determinations from officials.

That fact notwithstanding, individuals and corporations, the objects of regulation, routinely engage in compliance prediction based upon their expected conduct, and

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[113] Law students are often taught that legal analysis comes in two flavors "objective analysis" and "persuasive analysis." Objective analysis means that one is performing the analysis from the point of an objective third party, while persuasive analysis means that one is in advocacy role, attempting to influence the outcome in favor of one's client. I mean "objective" in the first sense, and not in the sense of objective indicating an external, determinable reality. *See, e.g.*, Julie M. Spanbauer, *Teaching First-Semester Students That Objective Analysis Persuades*, 5 J. Legal Writing Inst. 167 (1999).

[114] Oliver Wendell Holmes, The Path of the Law (1897), *reprinted in* 78 B.U. L. Rev. 699 (1998).

[115] *Id.* at 701.

modify their behavior accordingly. In many cases, they choose behaviors that they believe to be clearly compliant with the law. In these instances, it is reasonable to deem these assessments as determinations of liability, or conclusions of non-liability, even though, strictly speaking, they are probabilistic predictions with a high likelihood of occurrence. From a system-wide standpoint, the only actors truly capable of collapsing legal uncertainty into a legal certainty are the official legal decision-makers like judges or administrative officials. Thus, I speak of legal analysis as taking place in environments of varying degrees of probability about likely official outcomes.

To the extent that the probabilities of certain outcomes seem to be high, we can colloquially refer to these non-official assessments as legal conclusions or determinations. It is helpful to refer to them as conclusions or determinations, despite the fact that technically, until passed upon by a determinative legal decision-maker, they are in fact probabilistic predictions, whose likelihood is simply extremely high. Another way of thinking about such lay determinations is that, when the likelihood of an official decision-maker coming to a different result is extremely low, it can be usefully thought of as a legal conclusion.

2. What is Legal Determinacy?

The term "determinacy" in the law is used in various ways. At its root, legal determinacy is usually linked to relative certainty or predictability when assessing official legal outcomes *ex ante*.[116] To the extent that legal decisions are more predictable, we usually consider them to be relatively more determinate.[117] Conversely, indeterminacy refers to the degree to which legal determinations are *ex ante* unpredictable.

There are two interwoven concepts embedded in the idea of determinacy that are worth disentangling. Determinacy implies *ex ante* certainty about conclusions concerning liability. But we can think about two paths for arriving at relative certainty about a particular legal conclusion: legal conclusions that are certain because they are *ex ante constrained*, and legal conclusions whose certainty stems from *widespread agreement* about their likelihood because there is only one viable option.[118]

The first variant of legal certainty occurs when we think that legal decision-makers are constrained in the available legal conclusions that they can produce. In this scenario, officials are limited by formal substantive rules and procedures for generating legal outcomes. Because the range of outcomes is constrained by the *ex ante* rule-set, it becomes relatively easier to predict legal outcomes. In some cases, there may be only one available outcome under the given constraints. We can call this "constraint-based determinacy."

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116 Greenawalt, *supra* note 25, at 1-5.

117 Coleman & Leiter, *supra* note 109, at 580-585.

118 Frederick Schauer, *Formalism*, 97 Yale L.J. 509, 513-14 (1988).

The other meaning of "legal determinacy" involves certainty in the sense of widespread agreement about a legal outcome.[119] For example, imagine a scenario in which liability was predictable not because the outcome was formally constrained by rules, but because there was simply universal consensus on the likely outcome. Widespread agreement about a legal outcome might occur simply because one particular outcome is vastly more plausible or likely than others. In this way, we might say that the outcome is "determinate" in the sense that is predictable *ex ante*, but not determinate in the sense that the outcome is the result of formal rules which constrain analysis. Imagine a negligence fact pattern in which a defendant caused an accident because he was driving on the highway while looking away from the road to idly type a routine text message on a cell phone. There will likely be consensus that this conduct does not meet negligence law's standard of ordinary care when driving on the highway. The predictability of this scenario results because, absent other facts, there are no plausible competing arguments. We might term such a scenario as displaying "consensus determinacy" about the legal outcome, even if we can't point to a particular rule whose constraint makes this outcome deductively preordained. I raise this distinction between these two senses of determinacy only to clarify the scope of this Article's thesis.

This Article is focused upon a particular subset of relatively determinate legal contexts – contexts where legal outcomes are deductively constrained, rather than simply consensus-based. In particular, I am attempting to identify the characteristics of contexts in which official decision-making is so constrained that lay and official determinations about liability concerning the same facts and laws, are likely to be the same. Such constraint can occur through legal architectural decisions that remove choice on the part of legal officials (or make exercising official choice costly), or through policies of conscious forbearance on the part of legal officials in challenging reasonable assessments made by laypersons.

We can therefore think about legal determinacy as predictive agreement between officials and laypersons about the outcome of legal decision-making. To illustrate this point, at one extreme we could envision a legal system in which official liability determinations were explicitly linked to a highly objective, constrained and predictable legal rule with little substantive regulatory value. Joseph Singer offers the example of a legal system in which official liability decisions are always determined by the following rule, "The defendant is never liable."[120] Such a rule would be entirely *ex ante* legally determinate – laypersons predicting the outcome *ex ante* and officials constrained by the rule, would always come to the same result.

Nonetheless, if we agree that a major purpose of law is to influence human behavior in desirable ways, from a usefulness standpoint, such a law would clearly fail. The point is that law is ultimately a human creation that in principle could be made completely determinate, if not always usefully so. Relative determinacy is an artifact of the way in which laws are architected to trade off between the often conflicting goals of

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[119] Greenawalt, *supra* note 25, at 1-5.

[120] *See* Joseph William Singer, *The Player and the Cards: Nihilism and Legal Theory*, 94 Yale L.J. 1, 9-12 (1984).

predictability and legal certainty, and the substantive goals of regulating behavior flexibly, fairly, and effectively in an unpredictable and complex world.

3. The Concept of Variable Legal Determinacy

A major theme underlying this Article is that legal determinacy varies along a continuum among legal contexts in describable ways. It might seem to be a contradictory use of the term "determinacy" to claim that one can characterize it along a spectrum. After all, determinacy is often used as a synonym for "certainty," and the notion of "certainty" has a dichotomous sense to it – e.g. things are either certain or they are uncertain. Similarly, to say that legal outcomes in one context tend to be *more determinate* relative to another context might appear to be a strange use of the term. Nonetheless, I argue that it is useful to characterize legal determinacy as relative concept that exists along a spectrum rather than as a binary concept. As Larry Solum has suggested, most legal decisions are neither fully *ex ante* determinate, nor fully indeterminate, but reside in a middle set in which legal decisions are "under-determined."[121] I aim to draw out particular features that allow us to situate legal decision-making closer or further from the various poles within this under-determined spectrum. In comparing the personal income tax context to the First Amendment free speech context, we do not say that one is determinate and the other is not, but rather legal outcome under one appear relatively more determinate than under the other.

Determinacy and indeterminacy are correlative concepts that trade off on a sliding scale.

B. Idealized Formalist Model Preliminary Concepts

In this section I develop a theoretical model for *characterizing* the concept legal determinacy. I call this the "idealized formalist model," and use it to find a way to descriptively capture the idea that legal outcomes are relatively more determinate in some legal contexts than in others. Such a model will serve as a foundation for understanding which legal contexts will be amenable to automation, and why.

The idealized formalist model is guided by the following thought experiment: How determinate would a legal context have to be, and in what ways, for computers to be able to arrive at legal conclusions for a given set of facts? What assumptions about the determinacy of laws, facts, and how legal decisions are generated in a context would have to be in place in order to render a legal decision automatable?

We can think of the computer question as a framing device that has the effect of placing the concept of determinacy in sharp relief. Given the specificity with which inputs have to be crafted for deterministic computers, issues of indeterminacy rise to the

[121] *See* Solum, *supra* note 6, at 473 (Discussing that most legal contexts involve neither fully determinate decisions, nor fully indeterminate, but rather a larger category of under-determined decisions. In the under-determined context, the legal official is neither fully constrained, but neither fully unconstrained, instead she has a range of constrained choices).

forefront.[122] Legal contexts that approximate the theoretical characteristics of determinacy in the idealized model will be the most amenable to automation.

The idealized formalist model is so named, because it is loosely based upon views of legal decision-making propounded by early theorists from the legal formalist school of thought.[123] Any discussion of legal formalism is complicated by the fact that there are numerous distinct views that fall under this rubric, as well as several distinct and unrelated concepts suggested by the term.[124] I therefore call my model an idealized model because it does not represent the particular view of any scholar or branch of legal formalist theorists.[125] Rather, it is somewhat like the Platonic ideal of legal analysis that is typically associated with the early formalist school of thought. As typical early formalist models are no longer viewed as descriptively robust, it is important to note that I use it here mostly as a convenient framework for invoking commonly known concepts, rather than suggesting that the model has independent normative or explanatory value in contemporary law.

I will ultimately argue that legal contexts that approximate the idealized formalist model will be more deductively determinate, and hence, more amenable to *ex ante* computerized analysis. This model will give us a functional means of assessing the relative degree of legal determinacy in a given context.

1. Some Concepts Associated With Legal Formalism

Preliminarily, it is helpful to explore some core concepts underlying formalism that justify the structure of my model. In the sense used here, legal formalism describes a particular model for describing the generation of legal outcomes.[126] Formalism involves a view about how legal actors generate conclusions about liability in particular factual situations.[127]

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[122] Michael Sipser, Introduction to the Theory of Computation (1997) (discussing determinate finite state automata).

[123] *See* Langdell, *supra* note 5, at 20-21, for a famous example of legal formalist reasoning. In that case, determination as to whether a contract had been formed under the "mailbox rule" involved little more than 1) finding the rule – in this case, the famous "mailbox rule" that states that if there is a contract offer, and the offeree places the acceptance letter in the mailbox, then the contract is formed at that instant, 2) finding the facts – in the example, there was an offer and the acceptance letter was placed in the mailbox, and 3) applying the law to the facts using deductive logic – namely, the conclusive determination that the contract had been formed under the "mailbox rule" when the acceptance was placed in the mailbox.

[124] Pierre Schlag, *Formalism and Realism in Ruins (Mapping the Logics of Collapse)*, 95 Iowa L. Rev. 195, 201-04 (2009).

[125] This is not intended to be a comprehensive overview of legal formalism.

[126] Leiter, *supra* note 5, at 1141-42.

[127] *Id.*

If we think of the idealized formalist model as a model of legal outcome generation, it is useful to divide the model into two conceptual phases. The first phase is concerned with identifying the "inputs" to the legal outcome generation process. Potential law inputs include official sources of law (e.g. statutes, administrative regulations, judicial opinion, constitutional provisions) and penumbral law-like considerations and norms (e.g. public policies, lawmaker intent, principles, values). Inputs also include factual determinations ranging from relatively objective facts (e.g. temperature), to value-based or discretion-based factual criteria (e.g. bad faith conduct). This first conceptual phase emphasizes that legal decision-making in any given instance requires a threshold determination about what should be included or excluded in the process. This brings the focus to assumptions and constraints that any legal decision-making model has made about the range of appropriate inputs, as well assumptions about how determinate such input selections are *ex ante*.

Having identified the inputs, the second conceptual phase of formalist decision-making involves the application of the law inputs to the factual inputs. We separate this phase to highlight the fact that any model contains assumptions about the appropriate range of processes for generating legal decisions (e.g. decision-making according to a defined mode of inference, such as deductive or analogical reasoning). It also brings to focus any assumptions the model has about the relative resolvability in applying laws to facts using this decision-generating process.

Generating legal assessments can be thought of at a broad level as the process of identifying appropriate and relevant inputs, and applying those inputs through an analytical process to reach a legal conclusion.[128]

It is important to emphasize three main assumptions often associated with formalist decision-making:

> 1) The ability to filter applicable from inapplicable inputs to the legal outcome generation process *ex ante*;
> 2) An emphasis on "form," which implies a focus on *ex ante* reified and explicit inputs over implicit inputs;
> 3) Legal decision-making proceeding according to rules. [129]

Loosely speaking, the process of *filtering* involves the separating potentially applicable laws and facts into a definitive subset of laws and facts that actually apply to a given factual scenario. Legal decisions are made based upon this determined subset. *Decision-making according to rules* implies determinacy about the outcome when laws

[128] In later sections, I explore challenges to this view of legal decision-making from scholars. One strain challenges the assumption that legal decisions are usually, or always the process of a structured process for decision-making. The other strain challenges the degree to which legal decisions – especially by judges – are actually meaningfully constrained by limitations.

[129] Schauer, *supra* note 117, at 510 ("At the heart of the word 'formalism' . . . lies the concept of decision making according to rule.").

are ultimately applied to fact.[130] These formalist assumptions will be explored in more depth below.

2. The Tripartite Idealized Formalist Model

Under our stylized version of the legal formalist view, conclusions about legal liability in particular factual situations involve three main steps[131]:

1) Determining and ascertaining the applicable laws;
2) Determining and ascertaining the applicable facts; and then
3) Applying the law to the facts using deductive logic
to generate conclusions about liability.[132]

This model will give us a framework for characterizing and articulating the relative degree of legal determinacy in legal contexts. We must first imagine that our idealized formalist model is capable of producing *ex ante* determinate outcomes. Working backwards from this premise, we can identify those assumptions about the law and legal decision-making that would have to hold for such a model to produce legal decisions that were actually *ex ante* determinate.

Thus, these three steps will serve as a framework for identifying and organizing those assumptions that are necessary components of legal determinacy.[133] Having identified these determinate assumptions, we can then characterize the relative legal determinacy of legal outcomes in an actual legal context by the extent to which that context adheres to or departs from these reference assumptions. [134] We can use this model as a comparator for asking in what ways actual decision-making in particular contexts – such as the personal income tax context – is different or similar to this idealized determinate model? This will be our approach for characterizing relative legal determinacy.

3. Idealized Formalist Model and Filtering

What underlying assumptions about legal decision-making would have to hold for our model to produce determinate legal outcomes? In our model, we generate legal outcomes by applying the laws to the facts via deductive reasoning. I preliminarily assert

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130 *Id.*

131 Schaeur, *supra* note 100, at 124-26.

132 Frank, *supra* note 5, at 648-49 (characterizing legal formalism as a mathematical formula "Rule times Facts = Decision").

133 *See* Langdell, supra note 5, at 20-21.

134 The uniting theme for each of these formalist assumptions is that each has a flavor of *ex ante certainty* about the structure, process, and outcome of legal analysis.

that to produce determinate outcomes we must have a process for uniquely identifying, *ex ante*, the set of legal rules that will govern the legal decision in any given factual circumstance. Why this assumption? If we did not have such a means of *ex ante* uniquely identifying the applicable legal rules, or if the legal rules were unpredictable or changeable *ex ante*, our model would produce differing outcomes depending on the legal rules ultimately selected by an official. An *ex ante* unpredictable set of legal rules would be incapable of producing determinate legal outcomes.

At some point, in making a legal determination, a legal actor will have to separate out, from the universe of potential laws and facts, the particular ones that he will actually use in his assessment. How determinate is this filtering process for making distinctions? A core assumption underlying formalist decision-making is that there exists such a determinate process for *ex ante* filtering law or factual inputs, from the larger set of potentially applicable law or factual inputs.[135] For example, when performing legal analysis in the personal income tax context, the assumption is that there is some determinate means of identifying the relevant laws (e.g. tax laws), and disregarding those deemed inapplicable (e.g. building code laws). The requirement of an *ex ante* determinable set of laws and facts seems to presume that the relevant, legitimate, and necessary legal inputs can be separated out from the larger universe of laws and facts.[136]

C. Characterizing Legal Determinacy

1. Assumption – "Determining the Applicable Laws"

The first assumption relating to legal determinacy concerns the extent to which there is an objective and identifiable set of legal rules that govern legal analysis under a particular factual situation, and the extent to which a legal decisionmaker can *ex ante* determine these rules. We can think of this filtering of laws as occurring on two levels of abstraction. The first, higher level identifies *categories* of legal inputs that are considered appropriate at all for consideration in making legal determinations in particular contexts. At this high-level, there are going to be criteria, explicit or assumed as to which types of norms (e.g., positive laws versus background principles) can be legitimately considered in the legal determination process generally. A second, lower level of filtering involves determining the actual laws that govern a particular factual situation.

a. Screening: Separating Law from Non-Law, Legal Positivism

Legal determinacy seems to require that legal decision-making occurs according to an *ex ante* determinable set of legal rules. Let us suppose that a model of legal

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[135] Schauer, *supra* note 117, at 510.

[136] *See* Leiter, *supra* note 5 (asserting the notion commonly associated with formalism that legal reasoning proceeds through the process of applying logic to objective facts and objective, unambiguous rules).

decision-making must identify categories of legal inputs that are not valid for legal actors to consider in the decision-making process. Within the framework of the idealized formalist model of determinate decision-making, it appears that a legal official should consider only legally positive laws.

Let us call the process of officially specifying, identifying and cordoning off from legal officials invalid considerations "screening." [137] Legal-positivism frames one dimension along which legal inputs can be screened under the idealized formalist model. Brian Leiter helpfully clarifies the conceptual commingling between the concepts of formalism and positivism. Leiter notes that formalism is a theory of legal decision-making, whereas positivism is a theory about the nature of law – what does and should count as law, and ways in which society distinguishes "law" from "non-law."[138] Under our idealized formalist model, we can draw this distinction along positivist lines, recognizing such positive rules as the only valid source of law for legal decision-making.

Such a distinction fits with our threshold assumption that one must be able to identify the set of possible rules that count as law and be able to separate those from others that we do not consider valid law, to have a determinable set of rules.[139] Under the positivist view most closely associated with H.L.A. Hart – there is a principle for unambiguously identifying certain rules and norms as laws and others as "non-laws." Under this view, a rule or norm can only become a law by following the officially sanctioned lawmaking processes of the applicable legal system (e.g., enactment by vote of an elected legislature).[140] Any directive, rule or norm, that does not follow the officially sanctioned lawmaking procedure – the "criteria of legality" or "rule of recognition" – is unambiguously a "non-law" under the legal positivist view.[141]

The classic example of such a lookalike, non-positive directive is "natural law" – a normative assertion about what the law should be – frequently rooted in moral, philosophical, or religious justifications – but which does not have the official pedigree of a legal rule.[142] Other variants on non-positive norms are "general principles of law" such as justice or fairness, customary practices, and social norms. Frequently these non-positive statements have the typical rhetorical form of positive laws (e.g., "No person shall pay income taxes because taxation is wrongful stealing by the government.")

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137 Schauer, *supra* note 117, at 510.

138 *See* Leiter, *supra* note 5, at 1141-42 (distinguishing positivism as a "theory of law" and formalism as a "theory of adjudication").

139 *Id*.

140 Hart, *supra* note 31, at 100-20. Hart called this officially sanctioned law-making process the "Rule of Recognition."

141 *See* Leiter, *supra* note 5, at 1141.

142 Brian H. Bix, *Natural Law Theory*, *in* A Companion to Philosophy of Law and Legal Theory 223-25 (1996) (Aquinas distinguished positive law from natural law on the ground that positive law is "determined" in the sense that human discretion has made natural law specific and concrete.).

Despite the resemblance in form to positive laws, according to this view, such norms are decidedly non-laws if they have not emerged through the official lawmaking process. Under our idealized formalist model screening assumption, these non-laws would not be legitimate candidates for determining legal outcomes, because we have no clear means of identifying them like we do positive laws.

Underlying this idea is what might be called the assumption of separability in the idealized formalist model. The determinate model seems to require that legal officials be able to, *ex ante*, clearly separate law from non-law by some objective metric.[143] Our legal decision-maker who is attempting to define a determinable set of governing legal rules must have some means of delimiting the relevant set of laws from the larger (potentially infinite) set of hypothetically applicable norms. This assumption that it is possible for a legal official to unambiguously separate valid law from invalid non-law has been termed the "separability thesis."[144] While legal positivism's principle is not the only such demarcating standard, arguably, it appears to provide a relatively administrable one, and for reasons to be explained shortly, stands as a likely pre-condition for the realistic generation of consistently determinate legal outcomes.

b. Screening: Separating Penumbral, Law-Like Considerations

To produce determinate outcomes under the model, it further seems that legal decision-makers can only consider the *text* of positive laws, and not the penumbral aspects that are derivative of positive laws. Penumbral considerations of a statute include items such as underlying legislative intent, purposes, or public policies that likely animated its enactment.[145] Such penumbral considerations arguably represent a grey area not fully addressed by legal-positivism's recognition principle. From a legal positivist perspective, these penumbral considerations are arguably within the realm of legitimate positivist considerations – at least compared to natural law – because legislative purposes and intent are actually derivative of positive laws that have emerged from the official lawmaking process. However, like natural law, it is typically difficult to specific, with precision, *ex ante* the content of such penumbral considerations. Similar to non-positive laws, penumbral considerations are often implicit, and have not themselves explicitly gone through the recognition process (e.g., legislatures do not always vote explicitly and separately on a specific legislative purpose or motivating problem for every given statute that is enacted, nor do they necessarily explicitly include the motivations that produced each individual legal rule or provision).[146]

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[143] *Id.* (describing the positivist "Separability Thesis" as "What the law is and what the law ought to be are separate questions").

[144] *See* Leiter, *supra* note 5, at 1141-42.

[145] I label these considerations "penumbral" because, although they are derivative of a positive law – a statute – they loom implicitly in the background.

[146] Although this is not typical conduct, there are some statutes that do have explicit statements of legislative purpose.

Nonetheless, it is typical for legal decision-makers to have common or specific knowledge about the goals, problem, or purposes that likely animated a given statute. An official could in principle take into account these implicit, penumbral considerations such as likely legislative purpose, along with the explicit content of statutory laws, in arriving at a legal decision.[147] Employing such penumbral considerations – despite their implicitness – might inform a different result than the strict application of only the text of positive rules.

Determinacy under the idealized formalist model seems to require that such penumbral considerations – such as the underlying legislative intent or animating public policy – be screened from the legal decision-making process.[148] As Frederick Schauer states, "[f]ormalism is the way in which rules achieve their 'ruleness' precisely by . . . screening off from a decisionmaker factors that a sensitive decisionmaker would otherwise take into account."[149] Under textual-interpretive formalism only the text of a positive statute, and its "plain meaning" is to be considered in the process.[150] Penumbral considerations, despite their relevance in providing context, must not be considered in formalist decision-making due to typical uncertainties about their legal pedigree and meaning. Indeed, inadequate consideration of context is the sense in which the term "formal" is typically used as a critique, rather than as a descriptive category. When we criticize a judicial decision as overly "formal" we often mean that the judge has screened from consideration some potentially relevant consideration such as context or legislative purpose that would have painted a more nuanced picture of the substance, and has instead, focused on certain explicit and positive legal inputs that have passed the screening process.[151] The major problem is that the validity and relevance of any given penumbral consideration is typically highly contestable, and their usage by officials *ad hoc*, making them unlikely candidates for an objective, *ex ante* determinable rule set. The degree to which such contestable considerations play an influential role in official decision-making in a given context, will likely result in decreased determinacy of outcomes.

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147 Schauer, *supra* note 117, at 510.

148 *Id.*

149 *Id.*

150 Duncan Kennedy, *Legal Formalism*, *in* 13 The International Encyclopedia of the Social and Behavioral Sciences 8634 (2001).

151 Schauer, *supra* note 117, at 510. Schauer also notes that formalism is often used to critique a style of decision-making in which judges characterize the adherence to form over substance as one of compulsion, rather than choice.

c. Screening: Explicit and Reified Laws Over the Implicit

Under the model, determinacy seems to require that a legal decision-maker only employ legal rules whose form and content is unambiguously, *ex ante determinable*.[152] Note that being able to unambiguously determine the form and content of a legal rule is distinct from being able to determine its ultimate meaning. Thus, an underlying formalist assumption involves the favoring of explicit considerations over those norms or considerations whose substantive content is implicit or inconclusive. Previously we termed a law positive based upon the official nature of its pedigree – whether it was the product of a societal rule of recognition and met the criteria of legality. But there is another dimension along which we occasionally term a law positive, and that is based upon the explicitness of its form and content. We sometimes call a rule "positive" in this sense to the extent to which we can distinctly point out and disambiguate the content of the rule, most commonly because it is fixed in written form in some authoritative text.[153]

Let us call a rule "reified" if our requirement is that the form and content of the legal rule be embodied in some explicit, fixed, and identifiable form such as text. In the classic framing of the idea of reification, Jeremy Bentham stated that "laws" must be "conceived…always in determinate words."[154] This is a distinct, but common use of the phrase "positive" as applied to laws, norms, and other legal considerations.[155] If a model is to produce determinate legal outcomes, the ability to *ex ante* determine the form and content of the legal inputs is a prerequisite assumption. Statutes are the epitome of reified positive form – because we can point to them distinctly, and their content is fixed in written form in an authoritative text. By contrast, general principles – such as justice – are said to exist within the law, but often as broad overlay concepts, and not as reified objects of explicit form.[156] General principles are often neither clearly identifiable in content, nor have a single, unambiguously agreed-upon form.

We saw that legal principles and penumbral considerations are, as a matter of threshold determination, excluded as legal inputs from the idealized formalist model. A second reason for excluding these under the model is that the content of these inputs is not often *ex ante* determinable or determinate. Take for example, the public policies underlying a particular statute. Laws are often animated by multiple, sometimes conflicting, public policies. These animating public policies are often implicit, rather than explicit in the text of the law. Imagine that a legal decision-maker would like to use a particular public policy as a consideration in the decision-making process. This would require the narrowing and identification of the public policy into a particular identifiable

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[152] It is worth re-emphasizing that I mean determinate in the precise manner of deductively, textually formally determinate.

[153] Anthony Sebok, Legal Positivism in American Jurisprudence 30-31 (1998).

[154] *Id.*

[155] *See* Webster's Third New International Dictionary (2002) (defining "positive" as "[p]rescribed by express enactment . . . expressed clearly or certainly").

[156] Ronald Dworkin, *Hard Cases, in* Taking Rights Seriously (1971).

form. Because animating public policies are often broad, disagreed upon, and implicit, it would be difficult to *ex ante*, determine the form, scope, and weight, of such a public policy consideration. Because of that inability to determine its form and meaning, such a non-determinable consideration would be at odds with determinate legal decision-making.

The same issue concerning reification occurs if a legal decision-maker were to factor in legislative intent as a consideration in decision-making. It is usually difficult to determine, *ex ante* the form and content of legislative intent. Legislative intent is often implicit, multidimensional, and not reducible to any one particular, objective form. This is primarily due to the problem of drawing particular conclusions concerning the "collective intent" of legislatures composed of multiple individuals with differing goals and motives.[157] Like non-positive norms, and unlike positive statutes, there is typically not a single, fixed, undisputed form and content for these penumbral considerations. Rather, one will typically be able to elect from a range of plausible arguments as to the, sometimes inconsistent, legislative intent underlying a statute.

Similarly, the holding of a case, while *positive* with regard to its pedigree as a source of law, might not be sufficiently *reified* to count as an input for the idealized formalist model.[158] Case holdings are often implicit, rather than explicit. Implicit holdings are descriptions of particular facts that were decided in particular ways for particular reasons. It is rarer that holdings are explicit, as rules articulated specifically by the court (e.g., "Today we hold that . . ."). The problem is that the form and content of implicit holdings are often capable of being formulated later, at varying, plausible degrees of generality. Thus, the precise content of an implicit holding may not be unambiguously defined *ex ante*. By contrast, the form and content of a statute is reified and *ex ante* determinable, even if we imagine that the full scope of its meaning might not be.

In sum, if our model is to produce *ex ante* determinate legal decisions according to our model, there must be an *ex ante* determinable and objective set of legal rules that govern the analysis. To the extent that rules that we use are not *ex ante* reified – in other words, to the extent that there can be a threshold debate about what those rules are, and what their form and content consist of – this undermines the ability to produce determinate legal outcomes.

d. Determining Applicable Laws in Particular Factual Situations

Given a particular factual scenario, a legal decision-maker must ultimately determine *which* of the potentially applicable laws or norms actually governs that particular fact pattern. The previous section described the threshold screen presumed by the idealized formalist model – and ability to screen the appropriate types (e.g., positive

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[157] Greenawalt, *supra* note 25, at 20-21.

[158] Legal decisions are "positive" according to Hart to the extent that they have been created through an official lawmaking procedure, such as judicial common law. Judicial common law rules are simply separate, official sources of law from legislative rules. H.L.A. Hart, The Concept of Law 98-100 (1961).

statutes) of legal inputs envisioned by the model, from the larger universe of types of potential legal inputs (e.g., natural laws, legislative purpose) to legal decision-making. Let us imagine that a legal decision-maker has gone through the screening stage described above. Even if we have screened our potentially applicable legal considerations to the subset of positive, reified legal inputs, there must still be a determination as to *which* of those positive, reified laws actually governs a particular set of facts before the legal decision-maker. Again, theoretical determinacy seems to require that there be an objective means for determining which laws, of all those in force, actually govern the facts presented. If there was significant uncertainty about whether particular laws did or did not apply, we could not say that legal officials were making their decisions on the basis of an *ex ante* determinable set of rules.

Here we examine the following question: given a factual scenario, what are the applicable laws, and how determinate is it that given and particular legal rules apply? If we are assessing an automobile accident, which laws govern? Is it tort law, contract law, insurance law, vehicular laws, space law, or some combination of those? If we are assessing personal income tax liability, which body or bodies of law potentially or definitively govern given the facts? Within those bodies of law, which particular legal rules, doctrines or provisions, in turn govern?

We can think of this law-filtering as occurring at two points. First, we can think of filtering out entire bodies of law (e.g., tort law, contract law, space law) that appear inapplicable to a given situation, and identifying bodies of law that appear applicable.[159] Similarly, even within identified bodies of law, there is the assumption that we can identify applicable sub-rules and provisions. Implied in this idea is the view that legal contexts and legal rules are logically isolatable from the larger universe of possible laws with respect to given factual situations. For a system to produce determinate legal outcomes, there must be the assumption that "the governing legal rules" can be objectively determined given the facts as inputs to the decision-making process. To the extent that the governing laws or bodies of law are debatable or unclear in a given instance, this casts doubt on the ability to produce determinate legal outcomes.

e. Single Governing Legal Rule Per Issue

In identifying the laws that govern a particular factual situation, if we are to produce determinate outcomes, there is the embedded assumption that for each legal

[159] Thomas Grey identified two distinct components to this formality of structure in the legal formalist mode. *See* Grey, *supra* note 65, at 10-18. The first is that the laws are somewhat formally structured into bodies of law, rules within bodies of law, and elements within rules. Today, this view persists in the modern law, although not to the strong extent of perfectly orthogonal geometrical ordering of laws and rules envisioned by formalists like Langdell. The second aspect of formality of structure, what Grey calls "conceptual order," is no longer part of mainstream legal thought. "Conceptual order" refers to the idea that all legal rules, like mathematical geometry, should be formally deducible from a small number of axiomatic legal principles. While appealing to formalists of Langdell's era, this view is no longer seen as plausible, nor is it widely shared. I should therefore emphasize that this aspect of conceptual order is not part of the modern idealized formalist model for the purposes of this Article.

issue, there must be but a single, governing legal rule. In other words, we must assume that there do not exist multiple, legal rules, each of which could potentially be applied to provide an alternative legal conclusion on an issue. Otherwise, if there were multiple legal rules under which each the legal question could be resolved, then one could not know, *ex ante,* which of the rules would be the one that was ultimately applied. Thus, there is determinacy in the governing rule to the extent that there exists a single, clearly identifiable controlling law and which correspondingly implies the absence of choice on the part of the decision-maker among multiple applicable laws.[160]

f. Linking Positivism, Formalism, and Legal Determinacy

The earlier discussion articulated central assumptions concerning the *ex ante* determinability of the form, content, and applicability of laws that must hold if the idealized formalist model is to produce determinate outcomes. If determinate legal outcomes are indeed generated by applying laws employing deductive logic (an assumption to be explored shortly), then those performing legal analysis must be able to identify those applicable rules, and there must be agreement about those laws that apply and their form and content.

As the above section suggests, there is a link between legal positivism, legal formalism, and legal determinacy that it is helpful to explicitly reiterate and articulate. As used here, idealized formalism is a view of legal-decision-making based upon the notion that legal officials generate legal conclusions constrained by some fixed, objective, and *ex ante* determinable set of laws.

How do legal officials identify the set of considerations that they should employ in arriving at a legal decision? After all, there is a rather large universe of potential considerations – statutory laws, natural laws and principles, context purpose – that a legal official could employ in his decision. Legal positivism provides one principle by which legal officials can carve out a determinable, and relatively well-defined category of considerations – positive laws – from the large universe of possible considerations.

Finally, my contention is that, all things being equal, legal determinacy is generally increased when we have a context in which can *ex ante* identify the legal rules that will actually be employed by legal decision-makers. If we have two legal contexts, one in which the governing rule-set is relatively fixed, objective, and identifiable, and the other in which the rule-set is *ad hoc*, inconsistent, or subject to determination *ex post* by an official on a case-by-case basis, it is more likely (but not necessary) that legal decisions in the former will tend to be marginally more determinate. As I have used it, legal determinacy is concerned with constraint-based predictability on the part of legal officials. [161] It is hard to claim that legal outcomes are going to be *ex ante* predictable by

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[160] *See, e.g.*, John Hasnas, *Back to the Future: From Critical Legal Studies Forward to Legal Realism, or How Not to Miss the Point of the Indeterminacy Argument*, 45 Duke L.J. 84, 84-85 (1995) (showing that legal decision-makers often must choose between many plausible legal choices).

[161] *See* Singer, *supra* note 121, at 1-12.

non-officials, when it is not clear which considerations will ultimately be officially applied.

Similarly, all things being equal, we should expect legal determinacy to be generally increased when we can uncontestably identify the content of a legal rule. Legal positivism's association with reified legal inputs – statutory declarations – should ultimately have the effect of making less contestable what a law *says*. Clearly this is a different proposition from what a law *means*, what was intended to mean, which can and often is a source of indeterminacy. While there is room to debate the meaning of a statute, there is typically much less room to debate the statute's *form.* The form of the rule is apparent from the text of the statute and relatively incontrovertible in form (but not necessarily meaning). By contrast, legal authority that is not reified in a fixed text – for example, legislative purpose – there is room to debate both the form of the rule and, upon electing a form, its ultimate meaning. Thus, we would expect the reification of a law in a fixed, explicit, authoritative text, should have the overall effect of constraining legal outcomes in the contexts where they are applicable.

Another way of considering the relationship between determinacy, formalism, and positivism is by framing it in terms of choice.[162] As previously noted, theorists often characterize indeterminacy in terms of explicit or implicit choices available to legal decision-makers in making legal determinations.[163] To the extent that legal decision-makers have greater choice in the available rules or paths to various legal outcomes, there will be relatively more legal indeterminacy. By contrast, legal determinacy implies the relative absence of choice available to legal decision-makers in arriving at legal determinations. Formalism and positivism can be thought of as models of legal decision-making and laws respectively, in which the possibility of explicit choices available to legal decision-makers has been reduced *ex ante*.

2. Assumption – "What are the Applicable Facts?"

In this next section, I will explore a variety of assumptions concerning the ability to separate, identify, and assess legal facts that would be have to hold in a model that purported to produce determinate legal outcomes.

a. Determining Applicable Facts in a Particular Factual Situations

If the idealized formalist model purports to produce determinate legal outcomes, then there are several embedded assumptions related to the filtering of "legal facts." Again, let us suppose that we are applying the idealized formalist model to a particular factual situation to arrive at a legal outcome. The previous section discussed assumptions concerning the ability to filter applicable from non-applicable laws. Given a particular factual situation, there are analogous issues about the ability to determinately filter applicable from non-applicable facts.

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[162] *See* Kennedy, *supra* note 151, at 8634-36.

[163] *See* Singer, *supra* note 119, at 1-12.

Under a particular factual situation, a whole host of available "facts" could potentially be brought to bear on the issue. Ultimately a legal decision-maker must focus on a particular subset of facts, from the broader set of potentially applicable facts under that scenario. In order to produce determinate outcomes, there is the embedded idea that there is some objective means of separating and filtering the relevant from the non-relevant facts under the laws, in any given instance.

b. Measurability of Facts

The idealized formalist model contains the assumption that it is possible to objectively determine what facts actually occurred in a given situation. Similarly, there is also the assumption that the facts that occurred can accurately be measured or determined in a meaningful way.

3. Assumption – "Applying the Law to the Facts"

The third and final step of the idealized formalist model of legal analysis assumes the applicable laws and the applicable facts have been ascertained. Once ascertained, the final step involves applying the applicable laws to the relevant facts to determine substantive liability. This step, as well, contains several determinate assumptions about the process of legal analysis.

a. Legal Decisions Generated According to Formal Mode of Analysis

For legal decisions to be determinate under the model, they must be generated according to a constrained, determined process. Constrained legal analysis implies that authoritative legal actors are producing legal outcomes by applying the identified laws to the identified facts, through some particular, acceptable mode of legal inference (e.g., deductive, inductive, analogical, or instrumental reasoning). By contrast, it is possible that legal decision-makers are generating legal outcomes by some process other than constrained legal analysis, or by no process at all. The greater the extent to which legal-decision-making occurs according to an *ex ante* and defined, structured and predictable process, the more determinate the outcomes under that process will be. By contrast, the greater the extent to which legal decision-making occurs according to an *ad hoc* process or no process at all, the less determinate those outcomes will be.[164] The idealized formalist model assumes that all legal decisions made under the model occur through the process of constrained legal analysis.

[164] *See* Frank, *supra* note 5, at 648-63. Frank and other realists have been caricatured as holding the view that legal decisions can be so indeterminate as to depend upon what a "judge had for breakfast." *E.g.*, Dworkin, *supra* note 5 at 36 (noting that many factors lead to legal indeterminacy, despite the decision-maker operating within the constraints of legal formalism).

b. Deductive Reasoning as the Mode of Inference

In the idealized formalist model, deductive reasoning is the mode of inference that determines liability. Even if we assume that legal actors are indeed generating legal decisions according to constrained, inferential analysis, there is a choice about which of the acceptable mode of inference legal officials can use: deductive, inductive, analogical, or instrumental reasoning. The assumption underlying the idealized formalist model and its production of determinate legal outcomes, is that deductive logic is the only available mode of inference.

As described earlier, deductive reasoning is the application of formal deductive logic in order to generate conclusions that necessarily follow from the premises. Implicit in this idea in formalism is the notion that the only reasoning necessary in order to come to the correct legal conclusion is the application of deductive logic.[165] Having been supplied with the relevant laws, and the relevant facts, the job of the legal decision-maker – the judge or the lawyer attempting to determine liability – is simply to mechanically apply the laws of deductive logic

c. Focus on ex-post rather than ex-ante view

Legal decision-makers such as judges can view legal determinations from two differing time perspectives – the *ex post*, and the *ex ante* viewpoints.[166] Judges are most often considering a set of facts that occurred in the past, between the particular litigants before the court.[167] This can be termed the *ex post* view. However, in the common-law system of lawmaking, the decisions in particular cases – the holdings – become rules that govern future decisions through the principles of precedent and *stare decisis.*[168] Thus, judges can look at legal decisions from the point of view of the rule that will work best in future cases. We can term this the *ex ante* view, because it is considering the outcome in the current case from the perspective of its governing impact on future incidents that haven't yet happened, but may occur.

Depending upon the viewpoint taken, this can dramatically affect the likely outcome. A holding which benefits future litigants might come at the expense of fairness to the current litigants.[169] Similarly, legal analysis under certain facts, when applied

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[165] *See* Grey, *supra* note 65, at 16 ("[T]he application of legal rules to individual fact situations in the decision of cases was then like the application of geometric theorems to solve practical problems of measurement.").

[166] *See* Farnsworth, *supra* note 82, at 3-11 (2007), for an excellent discussion of this issue.

[167] The main exception to this involves decisions concerning injunctions involving likely future behavior. Various doctrines, including standing, prevent the court from considering factual circumstances involving parties *other than* the litigants before the court.

[168] *See* Farnsworth, *supra* note 82, at 3-11.

[169] *See id.* for an example of a bank robbery gone awry in which the bank teller refuses to hand over $5000. As a result of this, a customer is shot and killed. If the customer sues the bank

literally under deductive logic, might produce undesirable rules going forward. This forward-looking, *ex ante* best approach is often termed "instrumentalism" or "functionalism."[170] The idealized formalist model assumes that such forward-looking, instrumental analysis cannot be part of the legal decision-making process. If it were, the legal outcome would be determined by something other than an explicit, *ex ante* reified law. Rather, decisions under the idealized formalist model are based upon the deductive application of the applicable laws to the applicable facts, despite the implications of the decision going forward.

d. Forebearance in Review and Nonattendance to Exceptions

A well-known problem in jurisprudence is that the text of governing laws is often overinclusive and underinclusive relative to the behavior that is intended to be regulated.[171] For every law, there are going to be circumstances where the literal text of the law seems to apply, even if the purpose of the law is not served. In these circumstances, legal decision-makers are occasionally free to craft exceptions to the rule to avoid the undesired outcome.[172] The determinate context assumes intolerance to the application of such exceptions to literal application of the laws.

Moreover, legal decision-makers often have opportunities to second-guess or challenge even reasonable, and constrained layperson assessments of the law. In a determinate legal context, there will be implicit or explicit policies restraining or disallowing routine, independent reassessments on the part of officials of good faith, reasonable applications of the law.

e. Resolvability of a given law and decomposition of resolvability

Another assumption embedded in the idealized formalist model is that a given law is definitively resolvable one way or another, as applied to any set of facts. In other words, this is the assumption that there will be always a clear and objective answer as to the question of whether a given law has or has not been violated under a given set of facts.

A related assumption of the idealized formalist model is that the *resolvability* of the law as a whole is simply a function of resolving its individual parts as applied to the

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for negligence, the result might be different depending upon whether we take the *ex ante* or *ex post* view. If we look at it from the *ex post* view from the point of view of the customer plaintiff, $5000 seems like a small price to pay for somebody's life. But if we look at it from an *ex ante* view, finding banks liable might make them more willing to hand over money to bank robbers in the future to avoid liability. This in turn might incentivize more bank robberies overall, as robbers realize there is now more money to be had.

[170] Robert S. Summers, *Professor Fuller's Jurisprudence and America' s Dominant Philosophy of Law*, 92 Harv. L. Rev. 433, 433-49 (1978).

[171] Frederick Schauer, *Exceptions*, 58 U. Chi. L. Rev. 871, 873-75 (1991).

[172] *Id.*

facts. Most (perhaps all) laws are made up of subparts or elements, and can be logically divided into such elements. These elements are simply legal categories ("no person," "no motor vehicle," "no corporations under this code," "all citizens") or legal criteria ("unsafe," "substantial," "ordinary care," "greater than 65 miles per hour"). The idealized formalist model assumes that the resolvability of the law as a *whole* is equal to the sum of the individual resolutions of each of the individual elements, and the matching of each to a fact or a set of facts. In other words, to figure out whether the law, as a whole, applies is simply to resolve each of the elements to see whether the element applies to the facts. If every legal category and legal criterion applies, then the law, as whole, itself applies. This is the *assumption of decomposability* of resolution of the law through resolution of the individual elements.

f. Conceptualism of Legal Categories and Concepts

Conceptualism refers to the assumption that legal categories and concepts (e.g., legal elements and criteria) are sufficiently meaningful and expressive in themselves so as to permit one to derive legal conclusions from those categories and concepts, without the need to import extrinsic interpretive materials.[173] In other words, when a legal decision-maker is applying a legal rule based solely upon the text of the rule and the legal categories comprising its elements, that there is sufficient meaning inherent in the categories to permit its resolution.[174] Application of a law solely on the basis of its words and their expressed meaning is referred to as "textual interpretive formalism."[175]

For example, once again take the simplified legal rule, "No person may drive a vehicle upon a highway at a speed greater than 65 miles per hour." Within this legal rule are several legal categories, including "vehicle," "person," and "highway." Upon application of this rule to a particular factual circumstance – such an automobile driving on a particular road at a particular speed on a particular day – there must ultimately be a legal determination as to whether these legal categories apply to those circumstances.

Conceptually expressive legal categories are often constraining. We think of each of these legal categories – such as "vehicle" – as containing its own meaning – that is, a series of implicit shared, background contextual rules which help guide its application in any particular circumstance. For example the category "vehicle" might, with widespread agreement, implicitly contain the background rule "vehicles means 'motor vehicles.'" According to Hart there is often a "core of settled meaning" inherent in many of the words used to form legal categories.[176] To the extent that the implicit background rules that form the core of the meaning of legal categories are sufficiently expressive to guide

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[173] *See* Schlag, *supra* note 123, at 201-02.

[174] *See* Kennedy, *supra* note 149, at 8635.

[175] *Id.*

[176] Hart *supra* note 99 at 607 ("There must be a core of settled meaning, but there will be, as well, a penumbra of debatable cases in which words are neither obviously applicable nor obviously ruled out.").

and constrain application in any given application – when we look at a particular instance of an automobile on a highway, and decide that that the category "vehicle" does indeed cover automobiles – there is the legal conceptualism in legal categories.[177] By contrast, to the extent that legal categories are not inherently self-expressive in this functional way they may not be sufficiently conceptually meaningful to effectively constrain choice.

g. Formal Realizability of Legal Criteria and Categories

A core concept of legal formalism is "decision-making according to rule."[178] The idealized formalist model thus assumes that each individual element or legal criterion can be objectively, definitively and cleanly resolved under any set of facts. The extent to which the application of the law is relatively determinate by reference to external metrics is the degree to which such a law is "formally realizable."

Thus, the concept of "formal realizability" has two distinct components. The first aspect of formal realizability is the degree to which legal categories and criteria can be definitively applied and resolved under a given set of facts. According to Duncan Kennedy, it is the degree to which legal categories and criteria "have the quality of 'ruleness' " as opposed to the quality of a discretionary or uncertain standard.[179] The second aspect of formal realizability is the degree to which the resolution of the criteria or legal category is linked to measurable or explicitly defined, real-world facts. Thus our simplified vehicle law would be formally-realizable, because the criterion is "a speed greater than 65 miles per hour" is definitively and objectively resolvable one way or the other by a well defined, assessable real-world factual metric – the speed of the vehicle, as measured by, say, a radar gun or an odometer. To the extent that the predicates within a law are discretionary, the law is not formally realizable.

Decision-making according to rule is thus strongly related to both formal-realizability and conceptualism. Conceptualism implies that legal categories are inherently expressive enough to give rise to definitional tests that constrain their application to particular facts. Formal realizability means that these tests, once applied, will be capable of being definitively resolved, one way or another, by reference to real world facts.

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177 *Id.*

178 Schauer, *supra* note 117, at 510.

179 Duncan Kennedy, *Form and Substance in Private Law Adjudication*, 89 Harv. L. Rev. 1685, 1687-88 (1976).

D. Characterizing Indeterminacy

1. The Spectrum of Indeterminacy

Having provided a way to describe relative *determinacy*, we also need a means of characterizing relative *indeterminacy*. The argument thus far has been that particular legal contexts can vary along a spectrum in terms of the relative *ex ante* determinacy of legal decisions in those contexts. In the last section, I provided a framework for characterizing such relative determinacy. I did this by articulating a set of assumptions about the legal decision-making process that would have to hold for a legal context to routinely produce determinate legal outcomes. We need a similar method of describing degrees of legal *indeterminacy* in order to characterize legal contexts that reside at other end of the spectrum. In this section, I will provide such a framework by drawing from the research of scholars from the Legal Realist and Critical Legal Studies traditions. My method will be to use the idealized formalist model as a comparative foil, to articulate the model's descriptive inadequacies when contrasted with the way legal decision-making actually occurs under many real world legal scenarios.

Legal indeterminacy is largely a function of the choices available to official legal decision-makers.[180] In the typical instance, legal officials have a range of decisions that they must resolve: options as to what the laws are, what the facts are, how the laws are to be applied to the facts, what, if any formal process to abide by, and what the ultimate decision should be. Generally speaking, the larger the range of choices available to legal officials, the harder it will be to predict any one particular legal outcome. By contrast, to the extent that such choices are constrained, legal decisions will usually be relatively *more* (but not necessarily fully) determinate. The availability of more options along more dimensions is what characterizes relative indeterminacy in legal decision-making.

This insight – that there is a nexus between official choice and legal indeterminacy – was a significant contribution of the Critical Legal Studies and Legal Realist scholars. While their other contributions are too diverse to summarize here, these scholars, especially Critical Legal Studies writers, are most noted for the political valence of their arguments reacting against particular assumptions embedded in prior modes of legal thinking. It is important to note that my Article does not address the political or critical points from their scholarship. Rather, I will focus on what I think are some of their under-appreciated analytical and descriptive contributions in linking legal uncertainty to choice.

In critiquing legal formalism and embedded formalist assumptions in prevailing legal thought, many of these scholars essentially argued that the legal formalist view of decision-making provided an inaccurate, naïve, and over-simplified view of actual legal decision-making.[181] The legal formalist view was premised on the non-existence of

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[180] Singer, *supra* note 119, at 11-12.

[181] These scholars, especially Critical Legal Studies writers, are most noted for the political valence of their arguments reacting against particular assumptions embedded in prior modes of legal thinking. It is important to note that my Article does not address the political or critical points from their scholarship. Rather, I will focus on what I think are some of their under-

choice on the part of legal decision-makers like judges. Instead, the force of logic and rules was said to compel legal outcomes. Legal Realist scholars were the first to critique this view, highlighting the multiplicity of choices available to judges in the decision-making process.[182] The legal formalist model was vulnerable for professing to deny the application of choice in legal decision-making when choice was clearly involved.[183] Many Critical Legal Studies scholars took this enterprise much further, demonstrating a number of previously unrecognized, and more subtle choices available to legal officials.

One of the useful ways of thinking about this body of scholarship is to view it as a rather comprehensive taxonomy of the types of choices available to legal officials. Across a broad range of articles, these scholars thoroughly highlighted the points during the legal decision-making process in which options were explicitly or implicitly available to legal authorities. This in turn, in the aggregate, provides a useful (if unintentionally created) roadmap for identifying and characterizing relative *indeterminacy*. In explaining that the structure of modern legal discourse permitted a large, but finite range of viable legal arguments, these scholars mapped out the predictable patterns in which such arguments, and options occur.[184] In other words, even if the outcome of any given legal decision might be indeterminate, the structure, semiotics, legal moves, and range of ways which legal decisions can be indeterminate are *themselves* relatively determinate. [185] These scholars delineated the major points and axes along which legal officials tend to have choices when generating decisions.

In this section, I argue that we can use these recognized choice-points as a means for characterizing relative legal indeterminacy. These various, decisional-points, form the various dimensions of indeterminacy along which we can position a given legal context. In the previous section I identified a means of characterizing relative determinacy by legal contexts that adhere to the idealized formalist model. However, we can also characterize relative *determinacy* as the absence of potential *indeterminacy*.

2. The Major Ways in Which Legal Contexts Can Be Indeterminate

I will attempt to set forth some of the major dimensions of indeterminacy identified in the literature. In the previous section I identified several assumptions that would likely have to hold in a particular legal setting for outcomes to be truly *ex ante* determinate. My approach here will be to reiterate these assumptions and to provide for each, a corresponding critique drawn from the critical literature. We can consider these

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appreciated analytical and descriptive contributions in linking legal uncertainty to choice.

[182] Robert Hale, *Coercion and Distribution in a Supposedly Noncoercive State*, 38 Pol. Sci. Q. 470 (1923); Frank, *supra* note 5.

[183] Schauer, *supra* note 117, at 112 (characterizing critiques of the Supreme Court's famous *Lochner* decision as objections to the characterization of the decision as determined and denial of the possibility of choice on the part of the Court).

[184] Kennedy, *supra* note 178.

[185] Jeremy Paul, *The Politics of Legal Semiotics*, 69 Tex. L. Rev. 1779 (1991).

critiques the dimensions of relative indeterminacy. I will propose that we use these critiques to characterize the relative *indeterminacy* of legal decision-making in a given context. This is not meant to be an exhaustive list of the ways in which legal decisions can be indeterminate. Rather, I will summarize some of the important factors that contribute to the *ex ante* indeterminacy of legal outcomes.

In short, the legal formalist model, at least in the idealized form presented here, presupposed that there were definitive laws and facts covering a given factual scenario and that the job of legal actors was to discover and apply these laws to the facts to determine liability. In the anti-formalist scholarship, critics argued that in a given situation, basic questions about what the applicable laws, facts, and decision-making processes are much less certain or determinate than the formalist model implies. Many seemingly objective components of the law – such as which laws are relevant to a given legal analysis, and which facts are applicable to an analysis – are in many cases arguable, capable of being characterized in dramatically differing but equally plausible ways, and subject to inclusion or exclusion at the discretion of legal decision-makers. Thus, according to the critics, unlike the objectivity suggested by legal formalism, there was a fundamental inability to conclusively predetermine the inputs or outcome of legal decision-making.

Recall that I employed the idealized formalist model to help identify the assumptions underlying a hypothetical decision-making process that could be capable of producing determinate legal decisions. Let us once again imagine that we have an official decision-maker in the process of determining a legal outcome. For example, let us consider a Federal judge determining the status of a government restraint on speech, or a tax official determining an individual's liability under the personal income tax code. In order to produce determinate legal outcomes, the idealized formalist model tells us that the decision-maker must first make a determination of the applicable rules that govern the situation. Thus, we will first examine critiques concerning the degree to which the legal rules that govern any given factual scenario are fixed and *ex ante* determinable.

a. Determining the Applicable Laws

In order to produce determinate outcomes, the idealized model seems to require that the legal rules which govern any given factual situation are legally positive, unique, identifiable, non-contradictory, and are of a form and content that is unambiguous. For the model to presume otherwise would allow for uncertainty and choice on the part of a legal-decision-maker and indeterminate legal outcomes.

This first assumption – the proposition that legal decision-making is and should only be governed by positive laws – is subject to both normative and descriptive critiques. The idealized formalist model's positivist assumption – that legal decisions are based upon only those legal rules that have explicitly emerged from society's official "rule of recognition" – plainly does not hold when one examines many real world legal decision-making contexts. It is not uncommon in legal decision-making for judges and other decision-makers to employ considerations that are non-positive in nature (e.g. rationalizing a decision on the basis of higher principles of justice or fairness) as the basis

for their legal outcome.[186] Moreover, the normative principle that only positive laws should be determinative is by no means conclusively accepted, and several legal theorists expressly advocate for non-positive legal principles to be used in the judicial decision-making process.[187] From a realistic perspective, it is not difficult to find legal contexts in which it is more or less common or acceptable to invoke higher principles as a justification for decision-making. To the extent to which considerations that are not strictly legally positive in nature are routinely considered in a particular context, the idealized formalist model's assumption of only strictly positive governing rules is undermined.

Implicit also in the idealized formalist model is the notion that we can objectively, uniformly and cleanly, in any factual situation that we are trying to analyze – distinguish the applicable laws from the non-applicable laws. This is the positivist influence – implying the objective conceptual separability of all of the inputs in the legal analytical process. Let us take the example of a traffic accident, and imagine that we are attempting to determine liability under this scenario. A preliminary step requires us to answer the question, "What are the likely laws governing this legal context?" Of the entire corpus of laws, it is fairly easy to eliminate as likely irrelevant, large bodies of law – anti-trust law or space law, for example. This allows us focus on those areas of law that are possibly relevant – for example, tort, insurance, or perhaps contract law. In doing this winnowing of possible bodies of law, we are in effect, separating the relevant or applicable laws from the non-relevant or non-applicable laws. If we examine the assumptions embedded within the idealized formalist model, this process appears objective and clean. However, in reality it may not be so clear which bodies of law apply to particular factual scenarios. There may be doctrines of law that sit on the margins of particular sets of facts. The decision to apply certain bodies of law (e.g. agency law to an insurance policy in an automobile accident) may ultimately rest with legal official, and may not be determinable until that point.

Beyond this issue, there is an additional dimension of uncertainty. The idealized formalist model seems to require the rejection of legal rules whose form and content are not unambiguously *ex ante* determinable. To do otherwise would introduce rules of uncertain content, which would not lead to determinate outcomes. One could not determine the outcome of a factual scenario based upon applying a rule whose substance was *ex ante* ambiguous. Such a restriction appears to exclude from decision-making, those considerations that are penumbral in form. Again, such penumbral considerations include things like the implicit legislative intent and the unarticulated, but likely animating policy goals of legislation. For reasons detailed in the previous section, the

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[186] Singer, *supra* note 119, at 17 ("The availability of general principles, whether of constitutional or of common law, to nullify or limit the application of specific rules is a potentially devastating critique of the determinacy of legal doctrine. No matter how specific and easy to apply a set of rules is, its application is rendered less determinate if it coexists with legally enforceable standards that potentially could be used to eviscerate it."); *see, e.g.*, United States v. Wade, 388 U.S. 218, 229 (1967) (appealing to a "miscarriage of justice" in prejudicial criminal lineup).

[187] Dworkin, *supra* note 155.

precise content of such penumbral considerations are often uncertain, speculative, and open to debate (and hence provides choice among legal decision-makers). For example, a single piece of legislation often has multiple purposes, some of which are occasionally at odds with one another. Moreover, it rarely makes sense to talk of the "intent" of a collective body composed of separate individuals such as a legislature, each with different subjective and objective views and political goals.[188]

Once again, the assumptions of the idealized formalist model dovetail with what is observed in practice. It is common for decision-makers to invoke and employ penumbral considerations in their decision-making in practice.[189] Courts routinely speculate about the purpose, policy goals, and legislative intent of statutes despite the fact that the scope and form of such penumbral considerations is often ambiguous and subject to a range of plausible characterizations.[190] In order to explicitly rely upon a penumbral, contestable, or ambiguous consideration such as "statutory purpose," an official will elect just one of many possible, distinguishable formulations.. The extent to which legal decision-makers tend to employ or disregard implicit or ambiguous penumbral considerations might be more common in particular decision-making areas, and less common in others. The inability to predict which formulation an official will ultimately rely upon will tend to increase the indeterminacy of such decision-making.

A further questionable assumption enmeshed in the idealized formalized model, is that there is always a single, determinable governing legal rule that controls in a given circumstance. In many circumstances, there are actually multiple, explicit legal rules that facially govern a situation by their literal terms.[191] Thus, a decision-maker is often presented with an explicit choice of *prima facie* governing legal rules. It is not uncommon to have different legal rules on-point within the same source of authority. For example, within the same title of statutory code, there are frequently separate rules each of which might govern a given factual situation with equal plausibility.[192] Similarly, there are often legal rules on point emanating from different, equally authoritative, sources.[193] Beyond that, as some scholars have pointed out, sometimes plausibly

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[188] Greenawalt, *supra* note 25, at 20.

[189] *See, e.g.*, Munro v. Socialist Workers Party, 479 U.S. 189, 205 (1986) (speculating that "the only purpose this statute seems narrowly tailored to advance is the impermissible one of protecting the major political parties from competition precisely when that competition would be most meaningful").

[190] *Id.*

[191] *See, e.g.*, Watt v. Alaska, 451 U.S. 259, 266 (1981)("These cases involve two statutes, each of which by its literal terms applies to the facts before us.").

[192] *See, e.g.*, Smith v. Goldstein, 447 F.Supp. 1244 (D. Del. 1978)("Preliminarily, the parties dispute whether [10 Del. C.] section 8119 or section 8106 is controlling should both provisions be deemed applicable.").

[193] *See, e.g.*, Short v. Belleville Shoe Mfg. Co., 908 F.2d 1385 (7th Cir. 1990) ("Federal securities laws contain two candidate statutes of limitations. The first is § 13 of the Securities Act

governing legal rules actually logically contradict one another.[194] Thus, the assumption that there is always one, determinative rule, is simply not true in many instances. Decision-makers often have explicit choices among applicable rules.

Even when it appears that there is only one applicable rule, decision-makers can sometimes avoid applying that rule by creating an explicit exception. It is a staple of common-law rule-making to develop an exception where the literal application of a rule will result in undesirable or unjust outcomes.[195] In many instances, judges have explicit or implicit discretion to create such exceptions. Again, we can imagine a range of contexts to which the judicial creation of exceptions is common, tolerated and condoned to contexts in which decision-makers rarely invoke or are not permitted to create exceptions. Similarly undermining the assumption of the dispositive nature of existing rules, common law appellate judges have the ability to occasionally overrule even on point, existing laws.

This assumption is further undercut because decision-makers often have choices about the scope of non-reified sources of authority, such as case holdings. Judges can usually distinguish or apply given case holdings. The degree to which case-law holdings influence determinations about liability varies from context to context. In some contexts, such as broad areas of Constitutional law, the body of governing law is largely based upon case law. In such areas, to engage in predictive legal decision-making based solely upon textual sources without attempting to engage in case-law would often produce unhelpful and inaccurate determinations. By contrast, in other areas, case law plays a relatively smaller role. In those instances, often the body of applicable case law is much smaller, and it is accepted that much of the typical legal decision-making can be made based upon the text of reified statutes without subsequent resort to case holdings. It might be highly relevant to consult case-law in First Amendment jurisprudence, but practically irrelevant in terms of most day-to-day decisions regarding building code compliance. In legal contexts where case law plays a large role, there are additional choices as to which earlier cases, if any, directly (or analogically) apply and govern or influence outcomes given a particular factual scenario.[196] This renders such case law dependent contexts relatively less determinate.

Moreover, unlike statutory law, where the form and content (but not meaning) of the statute is embodied in an authoritative text, case holdings are often implicit. Courts often decide a case, and announce their reasoning, without articulating the rule of the case going forward. Thus, the holding of the case, and the governing rule drawn from that holding is often implicit, rather than explicit (e.g. "today we hold").[197] Because such

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of 1933 . . . .The second candidate is § 20A(b)(4) of the Securities Exchange Act of 1934.").

[194] Singer, *supra* note 119, at 15.

[195] Schauer, *supra* note 117, at 515. (Schauer describes a case in which a petitioner filed a form at 5:03 pm, missing a statutory deadline of 5:00 pm. The court avoided literally applying the rule by creating an exception due to the petitioner's determinental reliance on bad official advice that contributed to the delay.).

[196] *See* Cass Sunstein, *On Analogical Reasoning,* 106 Harv. L. Rev. 741, 744 (1993).

[197] For an example of such an explicit holding, *see* Duren v. Missouri, 439 U.S. 357, 360

holdings/rules of the case are *implicit*, rather than explicit and reified, their content is debatable and opening to varying statements of scope. When holdings are implicit, judges can often elect from among multiple plausible characterizations at various levels of breadth. It is important to distinguish ambiguity in the *content* and *form* of a legal rule, from ambiguity about the *meaning* of the legal rule. Even when we have a legal rule of unambiguous *form*, such as in a statute, there is still possible ambiguity about its meaning. The problem with an implicit holding is that there is potential ambiguity about *both* the form *and* its eventual meaning. This allows for even greater latitude among decision-makers, who can often avoid application of statutes or other holdings by invoking the penumbral rules embedded in implicit holdings.

b. Determining the Applicable Facts

Not only must a legal decision-maker grapple with the laws but she must also grapple with the facts to which those laws will be applied. The idealized formalist model has a series of assumptions about the determinacy of facts in a given scenario that are parallel to the ones concerning law. These assumptions have been subject to similar critiques in the academic scholarship. Several scholars have noted that often whether facts are considered relevant by decision-makers may be somewhat arbitrarily dependent on how they are initially characterized.[198] According to some critics, what appears to be a straightforward determination of facts by an official arbiter of the law may be more subject to *ex post* subjectivity than appears at first glance. [199]

In producing determinate outcomes, the idealized formalist model seems to imply that the relevant facts are fixed, unambiguous, and objectively ascertainable. Scholars have argued that there are often multiple ways of characterizing the same facts, and that, different characterizations can lead to different legal outcomes.[200] For example, Mark Kelman has noted that decision-makers often have to elect different time frames under which they analyze facts.[201] Framing, for example, the facts of a crime over a shorter or longer time horizon, can impact whether crimes are considered separate acts, or part of a continuous stream of activity.[202] Moreover, it is often possible to plausibly characterize the same set of facts at differing levels of generality in order to invoke or avoid the literal

(1979) ("Today we hold that such systematic exclusion of women that results in jury venires averaging less than 15% female violates the Constitution's fair-cross-section requirement.").

[198] Frank, *supra* note 5, at 650 ("There are simple controversies and they involve comparatively simple questions of fact. But the facts occurred long before the lawsuit arose. The facts themselves do not walk into court. The court has to guess what actually happened . . . .").

[199] *See* Richard Michael Fischl, *Some Realism About Critical Legal Studies*, 41 U. Miami L. Rev. 505, 513-15.

[200] *Id.*

[201] *See* Mark Kelman, *Interpretive Construction in the Substantive Criminal Law*, 33 Stan. L. Rev. 591, 593-95 (1981).

[202] *Id.*

application of a legal category.[203] The choice between one particular portrayal of a situation and another can lead to vastly different outcomes.[204] Several scholars have noted that often whether facts are considered relevant by decision-makers may be somewhat arbitrarily dependent on clearly subjective decisions.[205]

Similarly, the idealized formalist model presumes the *ex ante* ability to separate objectively relevant from objectively irrelevant facts. Again, in reality, the relevance and applicability of various facts is often a discretionary choice on the part of legal officials.[206] The idealized formalist model also presumes that there is one set of ascertainable facts that compel a particular outcome. In most scenarios, there are facts that militate towards one outcome and other facts that support towards the opposite outcome.[207] The decision-maker has to choose among the potential contradictory facts, and will often justify her decision by emphasizing the various facts that support its conclusion, and de-emphasizing those that undercut her conclusion.

Finally, the idealized formalist model contains the assumption that facts are objectively measurable. An obvious objection to this is that many factual categories are abstract or value-based, rather than framed in discrete quantities. Moreover, even when facts are, in determinable in principle, there will often be actual difficulties in *actually* determining them. For example, in a car accident scenario, there may be an objectively true answer as to the exact time that a pedestrian stepped off of a curb. In reality, the ascertainment of that exact time may be fraught with difficulty, involving everything from measurement errors, inaccurate evidence, or dispute among sources of evidence.

c. Applying the Laws to the Facts

Finally, writers have critiqued the model's assumptions concerning the process under which legal decisions are actually generated. The idealized formalist model assumes that legal-decision-makers generate legal outcomes according to a constrained, deductive, model of legal analysis.

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[203] Witness, in patent law, the rule excluding prior art references, depending upon whether the prior art is in the same field of art as the patent at issue. Narrow or broad framing of the field of endeavor can determine whether the prior art does or does not apply. In re Oetiker, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

[204] Coleman & Leiter, *supra* note 109, at 561.

[205] Frank, *supra* note 5, at 650.

[206] *See, e.g.*, United States v. Hathaway, 949 F.2d 609, 610 (2d Cir. 1991) ("[T]he proper inquiry in this case is solely a comparison of the elements of arson . . . into that crime's generic elements. . . . Accordingly, the particular facts of Hathaway's actual conduct . . . are not relevant.").

[207] Coleman & Leiter, *supra* note 109, at 561.

d. Logical Deduction as Mode of Legal Decision-making

We can think of the deductive mode of decision-making that is presupposed by the formalist model, as itself open to question. The view that legal decision-making always results from such a constrained, mechanized analytical process lends itself to several obvious critiques. First, some critics query the fundamental premise that legal decisions usually occur as the result of any constrained, analytical process.[208] Legal realist scholars, in particular, argued that many legal decisions could be attributed to idiosyncratic beliefs particular to individual judges, such as their political or value views, rather than resulting from any formal process of constrained legal analysis.[209] Even when operating within a constrained process, other scholars have noted that, despite constraints, decision-makers usually have choices to avoid mechanical outcomes.[210] Moreover, there is evidence that, in actual cases, legal decision-makers arrive at legal conclusions that are not be plausible if they are acting solely under the explicit constraints. Jury nullification, in which juries refuse to apply a clearly applicable law to avoid an unjust outcome, is one such piece of counter-evidence to the underlying assumption of legal outcomes solely based upon deductive reasoning.[211]

Even if we assume that legal decision-making proceeds in terms of a constrained, formal mode of inference or reasoning, the deductive mode of inference presupposed by the idealized formalist model is just one, among many accepted modes of reasoning or inference used in the legal decision-making process. Other modes of inference, such as *analogical* or *instrumental* reasoning are arguably more prevalent within the context of American judicial decision-making. Indeed, the entire structure of precedent based, common law decision-making is premised upon justifying legal decisions on the basis of analogical grounds from similar, but not identical, cases.[212] Likewise, it is common for judges to justify their decisions on instrumental (or consequentialist or "public policy") grounds.[213] Thus, the mode and process of decision-making in any given instance might itself be a matter of choice available to a decision-maker. The inherent discretion available to officials employing analogical or instrumental analysis, rather than deductive

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208 *Id.*

209 *Id.*

210 Singer, *supra* note 119.

211 Paul Butler, *Racially Based Jury Nullification: Black Power in the Criminal Justice System*, 105 Yale L.J. 677, 700 (1995) ("Jury nullification occurs when a jury acquits a defendant who it believes is guilty of the crime with which he is charged.").

212 *See, e.g.*, Akro Corp. v. Luker, 45 F.3d. 1541, 1547 (Fed. Cir. 1995) ("With both these guideposts in mind, we survey the various cases to which Akro and Luker analogize the instant case.").

213 *See, e.g.*, Int'l Soc. for Krishna Consciousness of Atlanta v. Eaves, 601 F.2d 809, 826 (5th Cir. 1979) ("For these reasons, we hold, as a matter of policy, that appellants' challenge to § 8 is not justiciable.").

reasoning increases the likelihood that the outcomes in those contexts will be *ex ante* indeterminate.

Additionally, the assumption that a legal official will employ the *deductive* mode of inference in generating legal outcomes suggests a particular and limited function for legal officials – that of ascertaining and arriving at correct legal answers. But in many legal contexts, legal officials are serving a different functional rule – that of final dispute resolution between conflicting societal entities. That is, legal officials are often called upon because two or more parties have plausible, conflicting rights or interests, and some authoritative selection among these competing interests is needed. Nuisance cases illustrate this well. The result of a nuisance case is often not so much the derivation of some objectively correct answer, as it involves the balancing of the related interests of, say, residents and a nearby polluting factory with an eye to public policy. Deductive reasoning as a mode of inference does not capture such scenarios descriptively. To the extent to which legal contexts routinely concern dispute resolution, involving the balancing or electing of competing rights and interests, the idealized formalist's assumption of deductive analysis will likely not apply in that context.

e. Inherently Expressive Legal Categories

In applying laws to the facts, the idealized formalist model assumes that legal categories and criteria are inherently expressive and self-limiting enough to constrain their application. Let us explore some critiques of this assumption. It is well known that many legal criteria are expressly designed, not to maximize *ex ante* determinability, but to give *ex post* discretion and flexibility on the part of decision-makers. This is the classic "rules vs. standards" distinction, where the inherent meaning of legal criteria cast as standards involve the explicit and intentional grant of discretion to an official (e.g. defendant's failure to employ "reasonable" care)[214] or, are cast at such a level of generality, so as to afford implicit discretion (e.g. an "ultra-hazardous" activity in torts).[215] Thus, legal outcomes resulting from legal standards are often not *ex ante* determinable, contravening the formalist's model's assumption.

Moreover, even among legal categories where discretion is not intended, the idealized formalist model seems to assume inherent meaning in every legal category so as to make its application routinely dispositive. This is the assumption of "category conceptualism." But it is clear that, some words are not inherently self-expressive. Some

[214] *See, e.g.*, Smith v. Arbaugh's Rest., Inc., 469 F.2d 97, 99 (D.C. Cir. 1972) ("Ordinarily, liability for negligence is based on the failure to exercise reasonable care in the conduct of one's personal activities.").

[215] A defendant who knowingly engages in abnormally dangerous activity or causes an abnormally dangerous condition to exist, may be held liable for any resulting harm to persons or property even if the defendant exercised reasonable care. Restatement (Second) of Torts § 519(1).

words are unintentionally ambiguous or vague. [216] Others words are "open-textured" words with intrinsically, broad, inclusive meanings. [217]

Moreover, even words with widely agreed-upon meanings (such as the term "vehicle"), in many cases, do not produce objectively dispositive outcomes based upon the word's inherent meaning alone. H.L.A. Hart's example of "No Vehicles in the Park" demonstrates that legal categories like "vehicles" are often proxies for more complex rules ("Non emergency, motor vehicles") that embody unarticulated underlying policies ("Overall safety, but exceptions for emergencies," "Non-motorized vehicles are typically safe and quiet") that animate the legal category.[218] Under Hart's conception, legal categories often have a core or settled meaning ("Vehicles as motor vehicles") that overlaps with the underlying animating policy ("Safety, quiet"), as well as a penumbral grey-area of unsettled meaning.[219] The degree to which the core-meaning dominates the penumbra varies from word to word. In some words, the penumbral grey-area overshadows any core meaning, leaving room for uncertainty and choice in its typical application.

Others have critiqued the assumption of inherent expressiveness of legal categories on other grounds. Some legal categories employ words that involve "essentially contested" concepts such as "privacy" and "autonomy," which are intrinsically value-based and not *ex ante* resolvable through logical deduction.[220] Moreover, others have pointed out that even words of apparently well-defined scope (e.g. real property) have their meaning change over time and framing, because shared understandings are always rooted in the larger context.[221] A final critique is that the application of most legal rules – even *ex ante*, reified, legal rules – require some minimal interpretation by the one employing them. The idealized formalist model fails to recognize that there are often, multiple plausible modes of interpretation (e.g. originalist, textualist, instrumentalist) which may result in different outcomes depending upon the method employed.[222] The only method of interpretation embedded in the idealized formalist model is strict textual-formalist interpretation.[223]

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[216] A word is ambiguous if there are at least two different plausible meanings are available. Unlike ambiguity, a word is vague if it is fundamentally unclear as to any meaning in context.

[217] *See* Hart, *supra* note 31, at 124-32.

[218] *See id.* for discussions of the concept of open texture.

[219] *Id.*

[220] Lawrence Lessig, *Understanding Changed Readings: Fidelity and Theory*, 47 Stan. L. Rev. 395 (1995).

[221] Robert W. Gordon, *Historicism in Legal Scholarship*, 90 Yale L. J. 1017 (1981).

[222] Karen M. Gebbia-Pinetti, *Statutory Interpretation, Democratic Legitimacy and Legal-System Values*, 21 Seton Hall Legis. J. 233 (1997).

[223] Kennedy, *supra* note 149, at 8634.

3. Determinacy as Absence of Indeterminacy

We have now elaborated a more robust means of capturing the concept of legal indeterminacy. To recap, we have conceptualized indeterminacy primarily as a function of the range of choices available to official decision-makers throughout the legal decision-making process. My claim is that indeterminacy is a quality that is usefully characterized along these multiple dimensions of choice. The previous section surveyed some of the most important ways in which choices tend to be available to legal decision-makers in generating legal outcomes. We thus can characterize legal indeterminacy in terms of these distinct "dimensions" of indeterminacy linked to the availability of official choice. In this section, I will argue that in considering indeterminacy in this systematic way, it not only helps us consider that concept more holistically, but it also allows us to better consider the concept of *determinacy*. We can think of determinacy not simply as adherence to the assumptions early identified in the idealized formalist model. We can instead more robustly characterize relative determinacy by the *absence of indeterminate choices that might be comparatively more available in other legal contexts*.

Before getting to that conclusion, it is important to re-emphasize an underlying point about indeterminacy and determinacy. Part of the argument thus far has been that it is possible to contrast the relative determinacy or indeterminacy of legal outcomes in different legal contexts. Thus, the average legal outcome in the First Amendment context might tend to be more indeterminate than the average outcome in the personal income tax context. But, the point is not simply that the determinacy of legal outcomes is characteristically different from one legal context to another. Nor is the point that the "indeterminate /determinate" classification is a false dichotomy. As mentioned, Larry Solum has persuasively argued that the vast majority of decisions in legal contexts are neither wholly determinate, nor wholly indeterminate, but fall in a broader third category of "under-determined" legal decisions.[224] Rather, the point is that within this broader category of "under-determined" legal contexts, the relative determinacy of legal outcomes can vary on a sliding spectrum from relatively more, to relatively less determinate. That is, the degree to which legal outcomes are constrained or involve official choices, can vary *incrementally* from context to context, along the previously identified dimensions.

So how can we account for the concept of relative determinacy? One way to think about the above discussion is that there are somewhat discrete points in the legal outcome generation process in which official decision-makers have to ultimately come to a determination. These dimensions correspond to threshold questions that officials must decide during legal analysis. Examples include questions about what law applies to a given liability determination, what the law means in a certain situation, which facts count, how to interpret the facts, how the facts are applied to the law, and whether other "extra-legal" considerations go into the decision-making analysis.[225] Whether there are going to be choices available to a decision-maker for a given decision-point will vary by context. In other words, we can view the choice-points identified in the aggregate by the Critical

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[224] *See* Solum, *supra* note 6, at 473.

[225] Coleman & Leiter, *supra* note 109, at 561.

Legal Studies and Legal Realist (and other) literatures, as the major types of choices that theoretically might present themselves to officials within the confines of the structured semiotics and agreed-upon bounds of American legal discourse and process.[226]

In some contexts we will see the full range of choices identified actually available to legal officials. However, in many other contexts, the types of choices actually available to officials will fall short of the theoretical possible extent. This is because in those latter contexts, many of the choice-points identified in theory will have been be explicit or implicitly constrained. For example, if we took legal indeterminacy to its logical extreme, we could argue that any legal norm could govern any legal decision. In reality, in the personal income tax context, for example, legal analysis is primarily and practically confined to only those provisions of Title 26 of the Federal Code, and the corresponding state and local codes, in most instances. Thus, we must separate the *theoretical* availability of choices, from the *actual* choices available to decision-makers in particular contexts. This is important because, from a legal theory standpoint, this framework gives us a vocabulary for understanding why it is that legal decisions appear to be more or less determinate in certain contexts. I will discuss this point more fully in Part V.

With that understanding in mind, let us now turn to the idea of characterizing the relative indeterminacy or determinacy of legal outcomes in a particular context. The general approach is fairly straightforward. Once we've identified a particular legal context, the idea is to explore how legal decision-making actually occurs in that context – who the relevant legal decision-makers are, and how the process occurs. We can characterize a legal context by whether it tends to adhere or depart from the idealized formalist model. To the extent that decision-making in the given context appears to actually embody many of the assumptions of determinacy identified in the idealized formalist model, we can characterize legal decisions as being relatively more determinate, on the determinacy/indeterminacy spectrum. By contrast, to the extent that actual decision-making tends to embody many of the theoretical dimensions of indeterminacy – including multiple, available choice-points for decision-makers – the context will be relatively more indeterminate.

This approach might seem to suggest that relative determinacy is a measurable characteristic that is consistent within a given context from decision to decision, across different officials, and over time. By contrast, it is clear that in certain contexts, some officials might take a more determinate approach (for example, to First Amendment decision-making) than their contemporary peers. The requirement of some characteristic level of determinacy for all contexts is not what I am suggesting. Rather, I am proposing that the consistency of the determinacy of decision-making across time, across officials, and across decisions, within a given context, is *itself* a dimension of relative determinacy. But it is also possible that legal contexts have inconsistent or non-characteristic determinacy properties, because legal decision-making is not uniform or consistent. [227]

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[226] Paul, *supra* note 184.

[227] This, I argue, would be a form of indeterminacy, because legal decisions would not be consistently predictable, even if they occasionally were.

Let's take an example, to make this framework more concrete. Once again, let's look at the personal income tax context – and determine whether legal outcomes in that context, overall, tend to be relatively more or less determinate. Our working intuition is that outcomes tend to be relatively more determinate --- buttressed by the fact that liability can be calculated, under this context, in many instances partially by computer. That is, while outcomes under the personal income tax context are by no means always determinate or predictable, they tend to be more predictable than, say, the average constitutional dispute. The major point is that the theoretical availability of choice by decision-makers tends to be relatively unavailable in the personal income tax context for various reasons. In other words, if we take the major dimensions of indeterminacy that have been developed in the literature – we find that these dimensions figure less prominently in the average determination of liability that occurs the personal income tax context, relative to other contexts.

Before applying the framework, it is important to reemphasize a central point, lest the reader be overcome by objections. My argument here is not that the personal income tax context is always or perfectly determinate. There are always going to be exceptions and special cases that we can find that will jump to mind. I am not saying that legal contexts such as the personal income tax do not sometimes involve nuanced issues of legal judgment, experience, and unpredictability. Rather, it is that legal outcomes under the personal income tax context are relatively *more* determinate than in other contexts. On the spectrum that characterizes indeterminate legal contexts on one end, and idealized formalist legal contexts on the other end, the personal income tax context is closer to the idealized formalist end of the spectrum.

Applying the Framework to the Personal Income Tax Context

There are two broad themes that help us to understand the relative determinacy of the average outcome in the personal income tax context. Again, let's consider indeterminacy as a function of choices available to official decision-makers. First, in law generally, it is probably true that the vast majority of legal analysis and assessment of legal outcomes is conducted, not by officials like judges or by trained lawyers, but by lay (non legally-trained) individuals. That is, if we consider the universe of legal assessments that are made on a daily basis – the vast majority of such assessments are made informally by those governed by the law – individuals and employees as they are going about their personal and work lives. They are informally and heuristically, or formally, determining whether their daily conduct is compliant with their formal or informal understanding of the law. (e.g. Lay drivers assessing whether their conduct comports with the vehicular laws in their daily commutes). This is often referred to as conduct operating "in the shadow of law."[228] Though it is true that there is some subset of those daily legal assessments that are made by judges, or by hired attorneys, they are likely small by comparison to that larger set.

[228] Robert H. Mnookin & Lewis Kornhausert, *Bargaining in the Shadow of the Law: The Case of Divorce*, 88 Yale L.J. 950 (1979).

This is similarly true in the personal income tax context, where roughly 70 million personal income tax returns are self-prepared by lay-persons, (most of whom who are not legally trained attorneys).[229] Thus, to a large degree, because the code regulates so many laypersons, its structure is geared around lay use and application. Thus, many of the legal categories and criteria that are employed in the code are intended to be meaningful to lay persons, and where not meaningful, reasonable lay interpretations are often accepted. [230] Again, this is not to say that there are not facts that present grey areas that must be litigated. However, on a percentage basis, out of the over 100 million assessments of tax liability actually conducted annually, these litigated exceptions are relatively uncommon. Even if these issues are sometimes litigated by filers with complicated facts, this does not mean that this is representative of legal assessment generally as I have characterized it within the larger framework of routine, informal analysis.

Second, the ability of officials to actually second-guess application of law decisions made by those non-legally trained individuals is relatively limited. From a numerical perspective, only a little over 1% of all returns are audited and hence receive significant scrutiny from official decision-makers.[231] Among the 1% of instances audited, even fewer of those result in substantive decisions by the individual actually being challenged. Moreover, there is arguably an implicit policy protecting reasonable, but incorrect, legal determinations that are made in good faith.[232] This suggests a deference to the ordinary and good faith analyses by lay persons, and a general

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[229] In 2008, there were 142,450,569 individual tax returns filed with the IRS. Internal Revenue Service, Individual Income Tax Returns Filed and Sources of Income, 2008, http://www.irs.gov/pub/irs-soi/08in12ms.xls. United States Government Accountability Office, PAID TAX RETURN PREPARERS, In a Limited Study, Chain Preparers Made Serious Errors (2006), 4. There is evidence that the number of self-prepared returns has increased significantly since then, due to increased use of tax software and e-filing.

[230] This does not mean that the personal income tax code does not have many highly technical terms of art that are inaccessible to laypersons. Rather, I mean that we can contrast the personal income tax code with other bodies of law that are primarily intended to be read and applied by expert intermediaries, rather than by lay persons directly. Federal antitrust laws come to mind as such an example. In that body of law, there is not the general expectation that non-legally trained individuals (e.g. ordinary laypersons) will be interpreting and applying the law on a regular basis. Rather, the intended regulated class in antitrust typically consists of sophisticated corporate entities with professional and expert legal representation.

[231] Kristin E. Hickman, *A Problem of Remedy: Responding to Treasury's (Lack of) Compliance with Administrative Procedure Act Rulemaking Requirements*, 76 Geo. Wash. L. Rev. 1153, 1188-89 (2008).

[232] *See*, 34 Am. Jur. 2d Federal Taxation § 71851 ("The chief requisites of criminal tax evasion are…a willful attempt to evade tax…The taxpayer may negate [the] IRS's claim of willfulness…by showing his good faith belief that he wasn't violating the law, even if that belief isn't objectively reasonable.") *See, also* 34 Am. Jur. 2d Federal Taxation § 71626 (Accuracy related penalties "do not apply to any portion of an underpayment if the taxpayer shows that there was reasonable cause for it, and that he acted in good faith.").

forbearance on official challenges to such assessments if they are truly plausible.[233] This policy of official forbearance reduces the role of choice in the authoritative decision-making process. One way of characterizing the income liability analysis is that of coming up with a liability assessment that is sufficiently close – within a margin of error – to the official determination – to be acceptable to the authorities.[234]

Returning to my model, an initial point of potential indeterminacy in any legal decision-making process concern the question, "What are the applicable laws?" [235] Unlike in other contexts those assessing their personal federal income tax liability will generally be justified in limiting their consideration to the one body of law – the rules housed in Title 26 of the Federal Code.[236] Contrast the personal income tax context with other legal contexts, such as the traffic accident scenario mentioned previously. There, a whole range of rules and doctrines from various bodies of law, ranging from tort law, contract law, insurance law, and health law, may or may not plausibly provide the governing rule set. In that context, there are threshold choices about governing laws that an official must make, contributing to overall indeterminacy as to ultimate legal liability. By contrast, for reasons explored more thoroughly in section V, personal income tax filers can generally be confident in limiting their analysis to the rules embodied in Title 26.[237] This is one less potential point of indeterminacy at issue in that context.

Generally speaking, we would expect the greater the number of plausible arguments that laws from different and varied areas of law need to be considered in the liability question, the more *ex ante* indeterminacy we would expect there to be concerning overall questions of liability. Moreover, the body of governing law in the personal income tax context is both relatively determinate, and reified in form. Similarly, penumbral considerations such as public policy or legislative intent are not expected to be part of the typical decision-making process of the lay taxpayer when engaging in legal analysis. As discussed, the possibility that officials might employ such unpredictable penumbral considerations in legal decision-making increases indeterminacy. Thus, the fact that the legal rules that govern the personal income tax context are relatively self-contained and *ex ante* determinable in both form and content, should increase the average determinacy of legal outcomes when compared to contexts where this is not the case.

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[233] *Id.*

[234] I am grateful to Professor Victor Fleischer for this excellent characterization.

[235] Due to space constraints, I will not proceed systematically through all of the potential dimensions of indeterminacy. Rather, I will proceed through several representative dimensions.

[236] *See* Michael James Bommarito II & Daniel Martin Katz, *A Mathematical Approach to the Study of the United States Code*, 389 Physica A (2010) (measuring the complexity of various provisions of the Federal Code, and determining that, by various complexity metrics, most of the related provisions are housed within Title 26 itself).

[237] Again, this is not to say that there are not exceptions to this rule, and some percentage of tax payers must consider a much more complicated host of rules. That is, there will be exceptions. But for the majority of tax payers, when taken in the absolute, this appears to be the accepted justification.

A second potential dimension of indeterminacy concerns the question, "What are the relevant facts?" Under the idealized formalist model, there is an assumption that there is an objective and distinct line between relevant and non-relevant facts. For many individuals in the personal income tax context the relevant facts are relatively easily discernable from the universe of potential facts. Determining income simply involves some combination of employer wages, and investment income for many filers. It is relatively easy, in the average case, to discern such income, as employers and financial companies, on reporting forms, have previously and explicitly so demarcated it.[238] Similarly, adhering to the assumption of the idealized formalist model, many of the underlying legal facts are measurable and definite. For example, the IRS offers a service where it can, for many taxpayers, determine that taxpayer's liability based upon available information about income and existing withholding and tax payments. [239] If the content and applicability of many of the threshold fact that went into the liability determination were routinely debatable and uncertain, this would not be possible.[240] By contrast, in other contexts – for example in a negligence lawsuit – the applicability and content of threshold facts are frequently contested, not-measurable, and capable of different characterizations. A significant number of the important substantive provisions in the personal income tax are "formally realizable," and therefore, can be definitively resolved by reference to tangible and measurable real-world facts.

Moreover, it appears that the lawmakers who created the personal income tax code deliberately chose many legal categories with relatively greater conceptual expressiveness – that is whose widely accepted core meaning resolves many, if not most, instances in which it is applied. For example, the personal income tax code uses legal categories such as "income" and "spouse."[241] By contrast, legal categories whose core meanings are open-textured or include explicit discretion – such as "reasonable" or "fair" may be relatively less present in the substantive provisions of this body of code.[242] To the extent that these meaningful categories have a strong "core meaning," and only occasionally produce uncertainties, there will be relatively increased determinacy

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[238] This might not be true in some more complicated cases, but in many cases, it is, and it is important not let the exception dominate the rule.

[239] Internal Revenue Service, The IRS Will Figure Your Tax For You: Publication 967 (2009). The IRS can determine the taxes automatically for many taxpayers.

[240] *Id.*

[241] 26 U.S.C. § 1(a) ("There is hereby imposed on the taxable income of—(1) every married individual . . . who makes a single return jointly with his spouse under section 6013.").

[242] For example, the term "reasonable" appears only 378 times in Title 26, comparatively fewer instances than in other comparable titles. Moreover, most of the time, the term reasonable appears in penalty and defense provisions for failure to file or provide information, rather than in substantive personal income rules. 26 U.S.C. 1, et seq. (2009).

compared with contexts routinely employing conceptually non-expressive, or open-textured legal terms. [243]

Finally, the model's third set of potential indeterminacies concerns the way in which legal officials actually apply laws to facts in decision-making. Like the idealized formalist model, much of the analysis in the personal income tax context involves deductive logic as the mode of inference. That is, in order to assess liability, much of the analysis actually involves straightforward mechanical deductive inference. In most instances, a taxpayer determining her liabilities need not resort to (nor is she expected to) engage in analogical or instrumental reasoning to predict or assess liability, nor will an official typically challenge such a lay assessment on the basis of a different mode of inference preferred by the official.

In short, the personal income tax context adheres to many of the assumptions of determinacy identified in the idealized formalist model.

4. Using Indeterminacy to Understand Computational Amenability

On a theoretical level, taking the argument from the previous section, we consider legal contexts relatively more determinate in nature because they exhibit *relatively fewer dimensions of indeterminacy*. We can systematically examine a given legal context along each of the dimensions of potential indeterminacy, and assess it along the indeterminacy-determinacy spectrum. If the portion of the law exhibits relatively fewer of these dimensions of indeterminacy, and more of the dimensions of determinacy, we can consider it practically more determinate. In other words, we now have a more rigorous way of characterizing determinacy -- as roughly approximating the idealized formalist model. As I am suggesting, when an area is practically determinate under this theoretical definition, it will also likely be more amenable to computation.[244]

Again, let's take as a starting point the idealized formalist model of liability determination. As indicated previously, if we were to encounter an area of law that approximated this model, it would likely be highly amenable to computation by rules based legal reasoning systems. In other words, if we were to find a portion of the law that exhibits to a greater degree, some of the following core characteristics of the idealized formalist model, the application of this law would be highly computable:

- The *set of legal rules* governing the factual context to be analyzed were relatively self-contained, separable from other bodies of law, individually isolatable, and *ex-ante* reified

[243] Similarly, take the building code context, in which there are often formally well-defined or informally well understood categories such as "windows." While there may be debates at the margin about what a "window" is in a building – perhaps a glass door blurs the line between window and door – by and large, the vast majority of the issues will involve conventional windows upon which all will agree.

[244] *See* Harry Surden, Michael Genesereth & Bret Logue, *Representational Complexity in Law*, Proceedings of the 11th International Conference on Artificial Intelligence and Law 193–194 (2007).

- The *individual legal rules* were formally realizable, and the legal categories that constituted the elements of the legal rules were conceptually meaningful and self-contained in their application
- The *facts* in arising from the typical context were relatively logically separable and measurable
- The *application* of deductive logic, as a mode of legal inference, produced legal decisions that were jurisprudentially acceptable and/or accurate.

As discussed, it is these theoretical characteristics that characterize much of the personal income tax context, and which make much of that context amenable to computation. Legal analysis of personal income tax liability implicates the Internal Revenue Code, Title 26 of the United States Code.[245] This body of law is a self-contained body of reified statutory law. It is separable from other, potentially applicable bodies of law, during the analysis of personal income liability, in most instances. Many (but not all) of the legal rules contained within the personal income code are consciously formulated as "formally realizable" rules. The individual elements which comprise those rules contain sufficient meaning for application, or are explicitly defined. Finally, many of the legal facts necessary for the resolution of the legal rules are numerical in nature and measurable. The rules are formulated such that deductive reasoning, as the mode of inference, produces authoritatively acceptable results. It is these characteristics that make it possible to create computer models of legal analysis in the personal income tax context, and computationally reason about those results.

IV. LEGAL INDETERMINACY IN COMPUTER MODELS

A. Linking Legal and Computer Models of Legal Analysis

As argued so far, the thesis of this Article is that portions of the law that appear more determinate – that is, that exhibit fewer of the dimensions of indeterminacy in the liability determination process – will likely be more computable by rules-based automated reasoning systems. In this section I will explore, from the computer science perspective, why a legal context that is more formalist and determinate will be more amenable to automated legal analysis.

1. Understanding Computer Modeling of Legal Contexts

We frequently use computers to analyze data that represent some phenomenon or aspect of the real world. To do this, we represent the data and the knowledge about the phenomenon or feature that we are aiming to analyze in a symbolic structure capable of being manipulated by computer systems.[246] This computational representation of the

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[245] I.R.C. § 1 (2000).

[246] A spreadsheet representing the income of a small business is a familiar example. In such

phenomenon is known as the *computer model*. Computer models frequently aim to simplify the phenomenon that they are trying to represent in order to make analysis tractable while still preserving its essential features to make such analysis useful. In the case of automated legal reasoning systems, we are attempting to create a computer model of particular laws and the manner in which they are actually applied within the legal system to particular factual circumstances. Computer models can be top-down, logically structured or statistical in nature; the focus of my analysis is on the former. Useful results from a computer system are only as good as the underlying computer model of the phenomenon or aspect of the real world that is to be represented.

The degree to which software engineers can create useful computer models of legal decision-making in a given context is dependent upon the degree to which legal decision-making in a given context is relatively determinate. This is because a software engineer has to create a computer model of the relevant features of the decision-making process from the perspective of the legal officials who are the official arbiters in that context. Such a model of decision-making might include, among other things, a model of the laws (and other factors) that determine legal outcomes in a particular context, and the manner in which these factors are applied. The easier it is to determine *ex ante* with specificity the legal rules and factors that go into official decisions in a particular context, the easier it will be for a software engineer to *ex ante* create an accurate computer model which incorporates these relevant considerations.

To understand why, consider the task of the software engineer who is modeling just one portion of the legal decision-making process – the set of legal rules and factors that govern outcomes. To produce useable results, computer models of legal decision-making must accurately represent the way official decisions are actually made in that context. As noted previously, in any given context, officials can consider a wide range of factors in their decision-making – from explicitly positive statutes to implicit and "penumbral" considerations. Outcomes depend not only upon positive statutory laws, administrative regulations and case-law precedent, but also common law doctrines, principles of justice, fairness, or equity, private and public institutional dynamics, the persuasiveness of arguments, ideological and personal considerations, public policy concerns, and rights and interest balancing of competing parties. Thus, in theory, to accurately represent decision-making, a computer model might need to represent any or all of these types of considerations.

Imagine the difficulty of creating a fixed computer model of a legal rule-set in a relatively indeterminate legal context. First, the relevant legal rules and other considerations employed by officials in decision-making may not be consistent from one instance to the next. For example, in the First Amendment context, there may be little consistency in the degree to which judges employ public policy concerns to resolve decisions from one case to the next. It may not be possible to predict the impact of any given factor in any particular instance with the certainty required by a computer model. Thus, a relatively static computer model may be fundamentally at odds with the way

a spreadsheet, the creator deems particular spreadsheet cells to represent inflows or outflows of cash over a particular time. The computer is able to calculate and manipulate the numeric cash values in the spreadsheet cells. Because of the structure imposed by the creator in assigning meaning to particular cells, and relating that meaning to the actual business, we can consider such a spreadsheet as an abstracted computer model of the cash flow of that particular business.

decision-making tends to occur in particular contexts. Second, certain factors that influence legal decision-making are extremely difficult to model computationally because they are simply too abstract or complex. For example, to the extent that specific concerns of public policy or fairness consistently influence decision-making in a given context, it may be impossible to usefully model the abstract and complex dynamics involved within a computer model. Computer models often require a form of representative reductionism of complex or abstract concepts and objects. Factors that are more abstract are correspondingly more difficult to reduce to a representative computer form *ex ante*. In particular legal contexts, official decisions routinely appear to take into consideration abstract principles such as "fairness" into the outcome. It would be difficult to create a meaningful computer representation of such a high level principle, because such principles are frequently capable of a wide scope in interpretation, weight, and meaning when actually employed by officials.

Let us consider a computer engineer who is attempting to create a computer model of a relatively indeterminate legal context, but who does not include certain difficult-to-model, yet influential factors, like public policy, that routinely influence legal decision-making in that context. Let's first take the example of a naïve engineer who does not have a nuanced legal theoretical understanding of decision-making in the First Amendment context. That engineer may be tempted to simply computationally represent the textual provisions of the Free Speech Clause of the First Amendment in her computer model. She might chose to do so because the Constitutional textual provision is fixed and relatively clear, or for practical reasons, because the other more abstract and indeterminate considerations are simply too difficult to model computationally.

Such a computer model would not adequately represent legal actual legal decision-making in that context. Such a textually focused model would miss the role that other factors beyond textual provisions play in legal decision-making in that arena. Clearly considerations such as historical bodies of case-law precedent, and competing public policies of free speech versus public governance, instrumental concerns, ideological, personal, and institutional dynamics, and factual nuances of an individual factual scenario, bear on most decisions. Moreover, these considerations may factor differently from case to case. The naïve software engineer who does not appreciate the role of such malleable extra-textual factors, will not be able to appreciate the limits on the creation of a useful computational model of legal decision-making in that context, nor the problems with creating a top-down, formally structured computer model, which usefully representing these considerations. [247]

[247] As noted, some researchers have created *statistical* models of legal decision-making in relatively indeterminate legal contexts. In these statistical models, certain variables are found to be relatively predictive of outcomes. *See* Martin et al., *supra* note 4. In that article, a statistical analysis of Supreme Court decisions determined that cases from the D.C. Circuit were likely to be affirmed by the Supreme Court. This, and several other general variables (such as whether a lower decision was classified as liberal), were predictive of legal outcomes. Such a list of variables, and their relative weighting, can also be considered a model of legal decision-making in a particular context – albeit a statistical model. The difference is that top-down, logically structured models attempt to express meaning explicitly, whereas the variables found within statistical models represent a variety of implicit data. Statistical models can be very robust, and can often expose relationships that were unknown to those attempting to create a top-down,

By contrast, in a relatively determinate legal context, it will be more feasible to create a representative computer model of the relevant set of factors and legal rules that determine decision-making. This is because the implicit and explicit constraints on choice and judgment act as a simplifying filter on legal decision-making. There are relatively fewer types of decisional factors for an engineer to model in a computer system, and those that are left to represent, tend to be more *ex ante* determinable, and more straightforward to represent computationally. Although legal formalism may be an inadequate descriptive theoretical model for most of American legal decision-making, and although legally formalist contexts are frequently criticized as inflexible and mechanical where they do exist, the simplification and determinacy of formal and determinate legal contexts turns out to be a benefit rather than a drawback from a computer modeling perspective.

To illustrate the point, let us consider a software engineer computationally representing the rule-set in a relatively determinate area such as the personal income tax context. The software engineer will be justified in omitting many of the abstract and indeterminate decisional factors – for example political or policy considerations – from her computer model. This is because the constraints on what officials can bring to bear on decision-making in that context permit us to essentially abstract away these factors from consideration; such factors are not permitted to routinely impact legal decision-making in that context. The decisional restrictions upon official legal decision-making across multiple dimensions of indeterminacy, allow us to safely ignore these considerations and still have a relatively accurate computational model of legal decision-making in that context.

In such a determinate legal context, a software engineer will be justified in simply relying upon representing the explicit positive statutory laws and regulations in her computer model, to the exclusion of other types of legal inputs. This is because in those contexts, through implicit and explicit norms of restraint and forbearance on official choice and review in legal decision-making, the easily identifiable positive provisions are the primary factors in decision-making in most instances. For example, for many, tax filers, our system has intentionally limited consideration to the *ex ante* fixed and determinable set of legal provisions contained within Title 26 of the Federal Code and related IRS regulations.[248] Because of this relative determinacy, engineers are capable of creating accurate computer models of the relevant legal rule-set in software systems such as *Turbotax*.[249] Were the majority of personal income tax decisions based upon a highly malleable set of legal rules determined on an *ad hoc* basis at litigation-time by officials, fixed, accurate computer models would not be possible. The more that the rule-set that governs official legal decision-making in a particular context is *ex ante* determinable and fixed, the more likely engineers will be able to created representative computer models of the governing rule-set.

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logical model.

[248] Samuel Donaldson, Federal Income Taxation of Individuals: Cases, Problems & Materials (2nd ed. 2007) 3-4.

[249] *Id.*

A useable computer model must also have a representation of the decision-making *process* – the way in which legal rules are used and applied -- in a given context. Determinacy considerations with regards to analytical processes will also impact our ability to produce an accurate model. The more that actual decision-making occurs according to a consistent, constrained, and determinate process, the easier it will be to model the process computationally. For example, if legal decision-makers and laypersons consistently employ textual, deductive legal reasoning to derive legal outcomes, such a process will be more amenable to computational models. To the extent that the process is *ad hoc*, inconsistent, and reliant upon more flexible modes of inference – such as analogical reasoning -- within a given context, the more difficult it will be to create a useable computer.

Finally, determinacy considerations relating to the form and content of legal rules will impact the ability of computer systems to partially or fully automatically apply these rules to facts. Let's assume that we have a set of legal rules that serve as the framework for legal decision-making in a given determinate context. Because we are operating in a relatively determinate legal context, we can be relatively certain that official legal decisions will actually be based the product of deductive application of this set of legal rules. Application of the legal rules in the context will consist of systematically proceeding through the rules, and where relevant, resolving them element-by-element.

As noted previously, the simple fact that we have an agreed-upon, determinable rule-set will not be sufficient to augment the determinacy of legal outcomes in a given context.[250] Rather, the elements of the legal rules – the legal categories and criteria within the body of the legal rules – must be sufficiently constrained such that their application is clear under most instances.

Take, for example, a building code regulation that requires that the minimum width of a window in a residential building is 20 inches.[251] My assertion is that a provision like this has been intentionally crafted so that when a layperson applies it to the typical factual scenario, the legal outcome will be relatively determinate. Consider what makes the application of this provision relatively determinate. First, the provision employs a conceptually expressive legal category in its predicate – a "window." The term "window" is conceptually expressive in the residential building code context because there is a broad core of settled meaning in the term. Thus, even without an explicit legislative definition, there is going to be widespread agreement between official and layperson about what qualifies as a window based upon implicit context. The strictures of language and context will correspondingly constrain official choice.[252]

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[250] *See, e.g.*, J. Clark Kelso, Judicial Technology in the Courts, 44 Am. Jur. Trials 1 § 20 (Describing a computer system that formalized the structure of the Federal Sentencing Guidelines. While the structure was formalized in computer form, the application of the individual components of the guideline contained criteria that were largely discretionary and left for the judge).

[251] *See, e.g.*, The International Residential Code, § R 310.1.3, requiring a minimum 20 inch width for at least one window in any bedroom.

[252] *See* Schauer, *supra* note 117, at 512. Schauer describes the way in which conceptually expressive words constrain official choice, noting, "When I say that pelicans are birds, the truth

Contrast the expressiveness of the term "window" with a less expressive legal category such as "the best edition of a work" found in the Copyright code.[253]

Conceptually expressive terms may be inherently constraining. Officials who wish to depart from core meaning in adopting an idiosyncratic interpretation will bear costs in doing so, including the costs of justifying their departure through explanation, the risk of having a decision overturned, and social norms that penalize such departures as improper. Over the long run, these costs should act to constrain the typical application. Additional implicit or explicit policies restraining official review and discretion can bolster determinacy by limiting the opportunities of officials to routinely challenge determinations by laypersons within the accepted range of meaning.

Moreover, the residential construction context is probably such that we would imagine that the typical instance of a window is going to be relatively non-contestable. True, there may be exceptions, but it is important to consider how common the exceptions are relative to the typical case. It is probably not the case that the grey area – perhaps a wall made of glass bricks -- will dominate the typical case, and or that for each and every instance of a window in a house design, the architect will debate whether it is or is not an archetypal window. We can expect the term window to cover the majority of anticipated cases without controversy. When examined in their entirety, we would imagine the majority of actual windows to be likely exemplars of prototypical windows, even if there is the occasional exception. The consistency of the likely factual scenarios arising in a given context is important for determinacy. There must be a correspondence between chosen terminology and range of plausible facts such that term uncontroversially covers the typical, anticipated case. Not every regulable context shares this characteristic of consistent, anticipatable facts.

Finally, the legal standard to be applied to the window is formally realizable. That is, we can determine compliance or non-compliance with this provision by a relatively objective, external metric – the width of the window measured in inches. In the typical instance, the architect who designs a window to these specifications can be relatively certain about *prima-facie* compliance with the regulation.

The same characteristics that make the application of this provision relatively determinate also make it more likely that we can make such a provision computable. An automated reasoning system can only apply and resolve legal categories if the logic underlying the category, and the data representing real world facts, have been structured in manner processable by computers. We can imagine two ways in which this might happen. In a partially automated analysis, a computer system can take advantage of an explicit assertion on the part of a person as to the applicability of an element within a legal rule.

To continue with our example, let's imagine an architect has created an architectural design for a residential house, using electronic architectural drafting software such as AutoCAD. In the process of creating his electronic blueprint, he has explicitly designated within that system that certain architectural elements in a particular blueprint are "windows." Moreover, assume that the width of the window was precisely designated in the design. An automated legal reasoning system could take advantage of

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of the statement follows inexorably from the meaning of the term 'bird.'".

[253] 17 U.S.C. § 101.

the architect's assertion that a particular element should be considered a window for legal compliance purposes, to determine whether the design complied with the minimum width provision. This "legal" assertion – that a particular element in is a "window" for which there are relevant governing legal provisions – has been captured in semantic, structured data in the electronic architectural design, and is hence processable by such a system.

We can term such an assertion about a legal category, element, or standard that has been memorialized in structured data, capable of being analyzed by a computer, a "captured legal assertion."[254] Potentially useable legal assertions are captured more commonly than most people realize. In the process of carrying out everyday business and personal interactions, it is not unusual to record and store explicit information about those interactions, which can be harnessed for legal compliance purposes. For example, consider a credit card issued to an employee for business use. If the card has been used appropriately, a corporation might take advantage of the fact that each use of this business credit card can be thought of as an implicit *legal* assertion that the purchase was for business purposes. Access to data about such purchases that have been pre-classified as business expenses can enable increased automation concerning tax compliance and business expense deductions. Similar examples will be found in any field that regularly keeps and depends upon electronic records. Businesses and individuals routinely make implicit and explicit assertions about real world objects or transactions which, when captured electronically, can be increasingly employed to automate legal assessment in relatively determinate contexts.

Employing this idea, certain laws might be reformulated so that the resolution of legal criteria might be made formally realizable by an explicit, statutory rule which links determination of that criteria to particular types of data. Such formally realizable rules are not always possible or useful in every context, as an explicit rule often requires reductionism in regulatory ability and flexibility. Legal rules amenable to computation are simply not appropriate for every, or most, regulatory scenarios, given the tradeoffs involved. However, in distinct situations, explicit rules based upon the resolution of data might serve as a sufficiently useful proxy for more complex regulatory goals. This is just to emphasize the following point: simply because contemporary computers do not have the technical capability for exercising independent, human-like legal judgment, need not mean that they cannot be used for automatic regulation where appropriate, as long as regulators realistically understand the technological limitations and social and regulatory tradeoffs.

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[254] Even without such an explicit assertion on the part of an architect, we could imagine other ways in which an automated system might logically infer that a particular architectural element found in an electronic building design is a "window," subject to compliance by the example provision. There might be an implicit rule describing windows that the computer system might take advantage of. For example, there are particular architectural symbols that represent windows that follow precise rules. A computer with a rule capable of deciphering these symbols might infer which elements are windows, and then analyze whether they are compliant with the provision. Finally, we could imagine there being a legal definition of a "window" containing a precise rule for resolving and applying that element.

2. What it Means for a Computer to "Understand" the Law

In a computer system that purports to engage in reasoning about the law and liability, the computer system must have some "understanding" about the substance of the law. What does it mean for a computer to have an understanding of the law? At its most basic level, this simply means that the underlying logic of the law is faithfully represented within the computer system. All computer systems that purport to engage in legal reasoning about laws assessing liability, have, on some level, a computerized "version" or representation of the laws, in a form that the computer is able to understand.

There are many means of representing the logic underlying laws in computer systems. Earlier in the Article, I noted that almost every law can be formulated into an "if-then" statement. This is because most laws are formed in such a way that they constitute a general description of a factual situation and behavior to be regulated – for example "driving a vehicle on a highway over 65 miles per hour" – followed by the legal consequences should that situation actually arise.

Thus, most laws can be re-formulated in the form IF *General Description of Situation* THEN *Legal Consequences* (civil or criminal liability).

At a simple level, computer systems purporting to engage in rules-based legal analysis often replicate this If-Then logical formulation. But the transition from written English rules to computer logical rules is not automatic. This If-Then structure must be translated by a person into computer understandable form. This usually means that the logic is replicated within a computer programming language. It is an important point that there is an essential translation going on in that process. A person – often a computer programmer must ultimately make an interpretation of the law – usually guided by an attorney or attorneys – and as closely as possible replicate the underlying logic of the law in the logic of software. Thus, within the personal income tax software that determines liability under the personal income tax code, there is a computer understandable representation of the logic of personal income tax laws. Such software contains internal symbolic representations of the logic underlying the provisions of the personal income tax code in a structured form capable of being processed by the computer.

For example, take the section of the personal income tax code that sets out the federal tax rates for marginal dollars earned. This is found in 26 U.S.C. § 1. In this section, the statute sets the tax rate for marginal dollar depending on income earned. What is the "substance" of this law to be translated into computer understandable form? It is the underlying logic that tells readers which tax rate to apply to additional dollars over certain income thresholds.

For example, in 2008, unmarried income tax filers had to pay federal taxes at a rate of 33% for every dollar of income earned over $164,550 but below $357,700, and a rate of 35% for every dollar earned over $357, 700.[255] In a computerized reasoning system which aimed to model the substance of this law and ultimately apply it, this underlying substance must be translated into computer code in such a way that preserves the underlying logic of the section. Thus, at a very basic level, we can think of this translation as a series of logical "if-then" statements, which say roughly, "IF income is

[255] I.R.C. § 1(c) (2000).

greater than $164,000 and less than or equal to $357,700, THEN the tax rate is 33%."[256] Because the logic of the substance of the law has been preserved and translated in the way that the computer can apply, we can say that the computer, in a very loose sense "understands" what the law means. Moreover, systems often have access to the data necessary to apply and resolve these legal provisions. Because income information can often be accessed, downloaded, and aggregated, along with information about the properties of the income (e.g. when acquired, source, type), the system can automatically apply the rules to determine tax liability in many instances.

Of course, many laws are much more complicated to represent than a tax schedule, which is mostly mathematical in nature. Representation in computer form of an object or concept often involves a form of simplification and reductionism in translating its underlying logic or meaning into computational form. We can imagine that many legal concepts – e.g. negligence or good faith – are simply too complex, amorphous, or contestable to be meaningfully represented by a series of logical statements and their interrelationships in an isolated computer system.

Note further that in the previous example, the computer was not required to exercise discretion or judgment in legal application – something beyond the ability of contemporary computers. Nonetheless, in a meaningful way, the system was able to efficiently resolve legal liability. Hence the connection between legal determinacy and amenability to computation – it is the very fact that relatively determinate legal categories and criteria are typically less abstract and more realizable that increases our ability to represent and resolve them computationally based upon their underlying logic. Finally, consider that the task of resolving liability, while relatively mechanical and determinate from a legal theoretical standpoint, was by no means simple or trivial from a legal compliance standpoint. In real terms, the task of aggregating data – for example income data – from multiple sources, and applying them to multiple legal provisions, is one of considerable informational complexity in terms of potential transaction costs, yet was capable of being automated.

We might also think of the related problem of interpretation by the computer programmer. By converting the substantive logic of a law into computer logic, the computer programmer has effectively made an assertion about the definitive interpretation of a law. As a practical matter, we know that laws are often subject to multiple interpretations. We might be worried about computer systems that purport to fix authoritative interpretations of the law in computer logic, when such interpretations are open to debate. Although it is not the subject of this Article, it is worth reflecting upon the fact that private companies that produce personal income tax software which are used by millions of U.S. tax filers, have become the de-facto arbiters of meaning of much of U.S. law, simply by virtue of their position as logical translator of software.

To take another simple example of a computer system purporting to represent the substantive logic of the law. Consider traffic law enforcement systems like "red light cameras." These are electronic camera systems that are poised at intersections and automatically take photos of vehicles passing through intersections when the traffic light is red for vehicular code violations. We can think of the red light cameras as enforcing a

[256] In reality, such provisions would be represented in a much more sophisticated computational form.

particular portion of the vehicle code – the prohibition on driving through intersections against red lights.[257] What this means practically, is that somewhere within this device is a rudimentary logical representation of the substance of the portion of the vehicle code governing driving through red lights. This example might not be so obvious, because the logic may be *implicit* in the design as to way the device works, rather through an explicit series of "If-Then" statements written in software.

Nonetheless, we can think of this system as replicating the basic logic underlying the substance of the law. The substance of the law asserts that the crossing of an intersection in the direction where the traffic light is red is a violation. The underlying logic of the legal criterion in the provision is formally realizable. We can definitively resolve whether this criterion applies in a given situation, because it has been formulated to be determinable by a relatively objective, external metric – the position of the vehicle in the intersection, and the status of the red light in the direction of the vehicle. To determine a violation, a red light camera can sense both when the traffic light is red, and when a vehicle is in the intersection in contradiction of the light. We can characterize the camera as arriving at a *prima-facie* legal conclusion about the violation of this legal provision when the car enters the intersection against the light. True, the camera might not always be correct in identifying motor vehicles, and it might occasionally ticket for legally excusable violations (e.g. an ambulance speeding to an emergency). I discuss such issues in the next section when we characterize automated determinations as simply *prima-facie* legal conclusions. Nonetheless, as long as the logic of a legal context can be faithfully reproduced in computer-understandable form, and the legal categories and criteria are formally realizable under accessible data, a system should be able to reasonably analyze factual situations under it.

The lesson is that some legal contexts happen to be determinate enough that we can make useful software models that capture their essential legal logic and meaning. Lawmakers did not create these legal contexts with the express intention of enabling automated legal analysis. Rather, they intended to create predictable and reliable legal rules for laypersons, in contexts where certainty and reliability are paramount. It just so happens that creating legal contexts that are determinate enough for laypersons to guide their behavior with certainty, also happens to create the conditions for computability. In other words, amenability to computation is simply a byproduct of particular aspects of legal determinacy. Thus, one proxy for discovering areas of law that are likely to be more amenable to computation is to focus on those legal rules requiring routine compliance by laypersons in predictable scenarios.

By contrast, as I will suggest in the next section, lawmakers might *intentionally* design legal rules with the express intention that they be computable. For example, FCC rules for the use of radio spectrum might be designed from the outset by lawmakers, so that electronic devices might automatically comply with the substantive restrictions on their use. Creating legal rights and obligations with the primary intention that they be computable is a different enterprise than modeling existing legal rights and obligations in

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[257] *See, e.g.*, Cal. Veh. Code § 21453 (2009) ("A driver facing a steady circular red signal alone shall stop at a marked limit line, but if none, before entering the crosswalk on the near side of the intersection or, if none, then before entering the intersection, and shall remain stopped until an indication to proceed is shown . . . .").

computational form. The difference is nuanced, but important, and requires important reflection on the degree to which computable laws can serve underlying regulatory goals.

V. CREATING DETERMINATE LEGAL CONTEXTS

In this section, I argue that lawmakers can consciously calibrate the degree of determinacy in a legal context. One reason that they might consider doing so is to make liability in that legal context more amenable to assessment by automated computer systems. Drawing from legal theory, I develop some general approaches for purposely adjusting the degree of legal determinacy in a particular context that lawmakers might pursue. Through this lens, they can explicitly consider the known trade-offs associated with determinate and formal legal contexts.

A. Determinacy Varies By Legal Context

The argument up to this point has been that the relative amenability to computation of a legal context is linked to a particular type of legal determinacy – deductive, textual determinacy. Moreover, the degree of legal determinacy varies among legal contexts. We have seen that legal contexts can be placed along a spectrum from less to greater legal determinacy. We have developed a theoretical means of characterizing the degree of legal determinacy in a particular legal context. One of the major contributions of the anti-formalist scholars was to provide a roadmap for the ways in which legal contexts tend to be indeterminate. Even if *particular* legal outcomes might be indeterminate, the *overall structure* of the ways in which legal outcomes tend to be indeterminate, is itself relatively determinate. In other words, there is only a limited number of ways in which legal outcomes tend to be indeterminate, and these points of indeterminacy tend to come in a repeated and predictable structure. This overall framework of the way in which legal contexts tend to be indeterminate, is what I have termed the "dimensions of indeterminacy."

We can get a rough approximation of the degree of legal determinacy in a particular, existing legal context, by comparing it to our abstract fully determinate context – the idealized formalist model. This approach is to assess the context along known points of indeterminacy. We can compare a given legal context – like the personal income context – to the idealized formalist model. We can then see where that context adheres to or departs from our idealized model. To the extent that it approximates that model, that portion of law is characteristically formal, and to the extent that it departs from that model it is non-formal and indeterminate. In this way, we can similarly characterize the First Amendment context as relatively less determinate than the personal income tax context along multiple dimensions.

B. The Degree of Determinacy in Law Can Be Calibrated

Not only can we characterize the relative degree of determinacy among legal contexts, in this section, I contend that determinacy can be, and is, consciously architected by lawmakers. This is based upon an important insight from the "Rules v.

Standards" literature. This major idea is related to the concept of "choice of form" of law. Choices that lawmakers employ in architecting the text of laws, in turn, can dramatically affect the substance of the law, and how these laws are applied and enforced. This in turns, tells us a great deal about how determinacy is instantiated in the law. [258]

To recap, one basic idea underlying the rules and standards literature is that lawmakers typically have the choice of multiple possible forms in which to express a given law, in writing. In other words, if the goal of lawmakers is to regulate a particular behavior, there are often different linguistic formulations of the law, and different levels of abstraction, that we can roughly characterize as aiming at the same underlying behavior. Depending on the particular form of the law chosen, there can be different substantive results in the application of the law.

To use our familiar example, imagine that lawmakers want to pass a law regulating unsafe driving. Lawmakers can choose between different linguistic versions of the "same" law – different versions aiming at the same underlying behavior. In the classic example, lawmakers might choose to create the unsafe driving law in the form of a "rule":

> Rule:
> "No one shall drive a vehicle faster than 65 miles per hour."
> versus the comparable law cast as a standard
> Standard:
> "No one shall drive a vehicle at unsafe speeds."

In both instances, these two laws, although cast in different linguistic forms and levels of abstraction, are aiming to regulate the same underlying *behavior* of unsafe driving.[259] Rules and standards can be seen as two poles of a particular dimension of abstractness. Most laws can be thought of as residing on a continuum between rules and standards, with some laws leaning towards the rule end, and others toward the standards end, often with no obvious distinction.

As discussed previously, a primary characteristic that makes a particular legal directive more like a rule, rather than like a standard, is that has a strong degree of factual determinability. This means that the legal criterion or category is structured such that one can determine, with a relatively strong degree of certainty, whether a rule has been violated in a given factual situation. Stating rule elements in terms of concrete, measurable properties of objects and entities involved in factual situations is the typical approach.[260] As Duncan Kennedy has described it, "The extreme of formal realizability is a directive to an official that requires him to respond to the presence together of each of a list of easily distinguishable factual aspects of a situation by intervening in a determinate

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[258] *See* Kennedy, *supra* note 178, at 1710 ("In picking a form through which to achieve some goal, we are almost always making a statement that is independent or at least distinguishable from the statement we make in choosing the goal itself.").

[259] Harry Surden, *Structural Rights in Privacy*, 60 S.M.U. L. Rev. 1605, 1616 (2007).

[260] *Id.* at 1710.

way."[261] The consequence of creating a law in the form of a rule that exhibits "formal realizability," is that there is greater *ex ante* certainty about legal outcomes for hypothetical and actual scenarios under the rule.[262] The rule is therefore more legally determinate.

In the frame of this Article's model, we can see that the text of a law is just one of the many dimensions that lawmakers can theoretically calibrate to increase constrained predictability. We can think of the "Rules v. Standards" literature as making the point that opportunity for choice can be architected by lawmakers through the tool of the language and form employed in formulating a law. But "textual form" is just but one of the many, potential points of indeterminacy in performing legal analysis. The idealized formalist model identified several other dimensions of potential indeterminacy or choice.

We can therefore extend the basic insight from the Rules and Standards literature about lawmaker choices in formulating laws. We can think, more generally, that lawmakers can architect increased determinacy by *ex ante* reducing known points of ambiguity and by *ex ante* limiting opportunities to interject uncertainty and choice in the law within a predictable structure. The next section will formulate two general approaches to this idea.

C. Disambiguating Meta-Rules to Increase Determinacy

How do lawmakers calibrate the degree of determinacy or indeterminacy in a given legal context? I suggest that one way they do this is through *disambiguating meta rules*. A meta-rule is a "rule about a rule." Rules regulate some subject matter. The subject matter that meta-rules regulate is *other rules*. A *disambiguating* meta-rule is a particular type of meta-rule which has been explicitly promulgated by a lawmaker to *ex ante* settle or constrain a predictable, and potentially open point of indeterminacy. Thus, lawmakers and other official legal decision-makers can make decision-making in a given legal context incrementally more determinate by explicitly resolving predictable points of legal uncertainty through the promulgation of disambiguating meta-rules.

In order to understand meta-rules generally, it is helpful to look H.L.A. Hart's analogous distinction in asserting that all laws can be classified as either primary or secondary rules.[263] The crucial distinction is that primary rules concern the regulation of basic human behavior.[264] Primary laws spell out the behaviors that people are prohibited from doing or required to do under the law – for example, the prohibition of stealing or the requirement to pay taxes.[265] Secondary rules are all of the other laws that aren't

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[261] Kennedy, *supra* note 179, at 1687-88.

[262] Cass Sunstein, *Problems With Rules*, 83 Cal. L. Rev. 953, 998-1002 (1995).

[263] *See* Hart, *supra* note 31, at 77-90.

[264] Of course laws regulate non-human entities, such as governments and corporations, but for simplicity purposes, I leave omit this.

[265] *See* Hart, *supra* note 31, at 77-90.

primary rules – that aren't concerned with the basic substance of what people can and cannot do.[266] Rather, secondary rules are mainly concerned with how the legal system itself operates – official rules about the process of creating[267] or changing legal obligations.[268] Hart's secondary rules are analogous to my use of the terminology "meta-rules," in that purpose of meta-rules is not to regulate something that is the primary concern of the system (e.g rights and obligations). Rather, the concern of meta-rules is to regulate some aspect (e.g. determinacy and predictability of substantive rules in the case of *disambiguating meta-rules*) of substantive rules that in turn are the primary concern of the legal system. In my formulation, meta-rules provide clarifying information about other rules, or topics touched upon or omitted by other rules.

It is important to distinguish between two distinct uses of the word "rule" in this Article. In the previous section, I spoke of a rule in the "Rules v. Standards" context.[269] In that context, the term suggested a particular categorization of a form of law that law-makers sometimes elect. A law formed in the manner of a "rule," such as a numerical speed limit of 65 miles per hour, exhibits a high degree of formal realizability. It is thus more formal, and liability is *ex ante* relatively more predictable under a given set of factual circumstances (e.g. a vehicle traveling 80 miles per hour). By contrast, in this section, when I speak of a rule in the sense of a "meta-rule," I refer to the generic use of the term "rule," which simply means a directive that regulates behavior, regardless of form. In that generic sense, all laws are rules. To avoid confusion, I will refer to the "Rules v. Standards" meaning as a *formally realizable law*.

A *disambiguating* meta-rule is an explicitly promulgated rule by a lawmaker that *ex ante* resolves an anticipated, potential point of indeterminacy in legal decision-making in a given context. Thus, lawmakers and other official legal decision-makers can make an area of law more formalist or determinate by resolving legal uncertainties through the promulgation of disambiguating meta-rules. A common example of a disambiguating meta-rule can occur in the interpretation of legal writing.

A good example of a disambiguating meta-rule comes from the Copyright Act. In several places, the act includes lists of exemplars, prefaced by the language "such as." For example, in describing the copyright doctrine of fair use, the act states, "the fair use of a copyrighted work…for purposes *such as* criticism, comment, news reporting,

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[266] Hart also described primary rules as those that are "duty imposing" and secondary rules as those that are "power conferring." *See* K.-K. Lee, *Hart's Primary and Secondary Rules*, 77 Mind 561 (1968).

[267] For example, a well known secondary rule is the "rule of recognition." This, according to Hart's positivist theory, is a rule that society uses to officially create substantive laws.

[268] D. Gerber, *Levels of Rules and Hart's Concept of Law*, 81 Mind 102 (1972).

[269] The term "rule" has emerged from the literature as the common way of referring to a law which is formally realizable. This is unfortunate terminology, because it is so ambiguous, given that the term "rule" has so many meanings. However, I will continue to use the term "rule" in order to be consistent with the existing scholarship.

teaching,...scholarship, or research, is not an infringement of copyright."[270] This "such as" language potentially raises a known and commonly repeated pattern of ambiguity and point of potential indeterminacy: Is this meant to be an exclusive list or an illustrative list? In statutory interpretation, this ambiguity is usually settled by resort to one of the canons of statutory construction. On one side, there is the canon of construction *expressio unius est exclusio alterius* - the express mention of one thing excludes all others. This would imply that that lists of items in legislation should generally be interpreted as exclusive and closed-ended. On the other side, is the common meaning of the phrase "such as" which suggests an open ended, or illustrative list.

Based upon common interpretation practices, most would probably give the interpretation as an open-ended illustrative list the edge based upon the "such as" language. However, there would certainly be a debatable point of ambiguity here. The Copyright Act specifically addresses this potential point of indeterminacy with a disambiguating meta-rule. The act states, "The terms 'including' and 'such as' are illustrative and not limitative."[271] In directly resolving this potential point of indeterminacy, the Copyright Act was made incrementally more determinate than it otherwise would have been.

Interpretive Process Meta-Rules

Another example will illustrate other applications of disambiguating meta-rules. In interpreting contracts or legislation, there are often open questions about the *purpose* of the legislation and about the intended "mode of interpretation" of the legislation. This is a potential source of indeterminacy, because at a later point, there could be open, equally plausible arguments about the desired mode of interpretation of legislation by the authors.

To use a familiar example, there are often debates about whether to employ originalist or non-originalist modes of interpretation in Constitutional cases. In theory, authors of such documents can include self-referencing disambiguating meta-rules within the document itself which can reduce (although not completely eliminate) a potential source of indeterminacy. For example, we could imagine a version of the United States Constitution that explicitly included a clause that said, "The default mode of interpretation for this document should be to give meaning as it was originally understood by the authors at the time of writing."[272] Or, we could equally imagine a clause indicating that the default mode of interpretation should be "flexible to take into account changing societal values and realities." These are both examples of disambiguating meta-rules which help make an area of law incrementally more determinate by disambiguating an outstanding indeterminacy.

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[270] 17 U.S.C. § 107.

[271] 17 U.S.C. § 101.

[272] *See* Andrew Coan, *The Irrelevance of Writtenness in Constitutional Interpretation*, 158 U. Pa. L. Rev. 1025, 1040 n.47 (discussing normative implications of such a hypothetical provision).

Meta-rules can be implicit or explicit. For example, let's apply this idea to the personal income tax context and consider once again what makes this context relatively more determinate, and hence computable. The vast majority of tax filers believe that they only need to consult the legal rules contained within the personal income tax code, and do not need to look to other areas of law, such as antitrust law in order to be compliant with the law. Although there is some number of filers who have very complex tax filings who are perhaps exceptions to this rule, there are many filers who fit this profile.

What justifies this belief that their legal duty is satisfied by examining only those rules contained within the personal income tax context? In many other areas of law, this is an open area of indeterminacy – it is often quite arguable that many other areas might govern a particular liability context. How did this disambiguation come about? Such taxpayers justified in their belief in two ways: formally, through the language of the personal income tax code[273], and informally, because of official conduct on the part of the Internal Revenue Service (IRS). Let's explore the latter, considering the norm of forbearance as an informal meta-rule. The IRS accepts the filings of millions of taxpayers who have only assessed their tax liability under the personal income tax code. From a practical standpoint, we can think of the IRS as having created an informal or implicit disambiguating meta-rule, which collapses a potential point of indeterminacy, into a point of relative determinacy. The IRS is implicitly validating the conduct, for most taxpayers of ignoring other (arguably relevant) bodies of law by refraining from consistently challenging the determination of tax-liability based primarily on the provisions of Title 26.

This informal, meta-rule example is important, because it represents an overall theoretical approach for creating new areas of law that are amenable to computation. As I mentioned earlier, part of why practically determinate contexts are relatively more computable is that we can think of them as simplifying filters for the creation of accurate computer reasoning models. Should lawmakers choose to make new and future areas more amenable to computation, they can consciously do so by promulgating disambiguating meta-rules to collapse points of indeterminacy to make them more determinate. Similarly, lawmakers could choose to ignore the potential area of indeterminacy, implicitly creating indeterminacy about this point of legal decision-making.

D. Making Non-Amenable Areas of Law Amenable to Computation

1. Standards Often Decompose Into Rules

We can employ the ideas of this Article to discover other formal elements in the law. As suggested previously, formal and determinate legal contexts are more likely to be amenable to computation than others. We can use this approach to find portions of the law that previously seemed non-amenable to computation, and make them more

[273] For the formal disambiguating meta-rule language, *see* 26 U.S.C. § 1 ("There is hereby imposed on the taxable income of every a tax determined in accordance with the *following* table") (emphasis added).

amenable. Let's consider rules and standards as opposites on the spectrum of relative determinacy. In theory, standards are less determinate and more subject to uncertainty and discretion. However in practice, many indeterminate standards actually *decompose* into determinate rules.[274] That is, in order to comply with discretionary standards, laypersons looking to comply with the law often, for a practical matter, construct intermediate "rules" that are much more administrable that they believe are compliant with the standards. Thus, much of the law that appears not-amenable to computation, might be more amenable than it seems upon first glance, if we can capture these informal intermediate rules, which are said to be compliant with the law.

For example, let's revisit our earlier example of submitting "business expenses" as a tax deduction from a theoretical vantage point. The phrase "business expense" is a classic *standard*, in that it is indeterminate, open-ended, and not well defined. However, as we observed previously, many individuals, in an effort to comply with legal standards such as this, actual adopt implicit rules in practice. People and businesses cannot typically function in an environment of complete legal uncertainty, so they often adopt intermediate rules and policies that they believe are a good proxy for compliance with legal standards.

It is these rules and policies that we might be able to capture computationally. Thus, a business user might adopt an administrable rule that he uses his business credit card only for lodging and travel expenses incurred during business trips. In this case, the previously indeterminate standard has decomposed into a determinate rule. According to the thesis of this Article, since this rule serves as a proxy for the standard, but is now more formal and determinate, this might be captured in automated reasoning systems. Such systems might be able to incorporate business expenses under this formal rule because there is a implicit legal assertion that the expenses coming from the business credit card are fall under the legal "business expense" standard. It is possible to capture, within computer systems, this previously indeterminate aspect of income tax law.

Let's take another example of a law phrased as a standard, which, for practical compliance purposes, might collapse into an intermediate rule. [275] One building code regulation indicates that in order to comply with the American With Disabilities Act,[276] door handles must not "require tight grasping".[277] The phrase "tight grasping" is a classic standard in that it is indeterminate and open-ended. However, imagine an architect attempting to comply with this open-ended standard in practice. She might create an informal intermediate rule. We can imagine an offical industry organization that tests door handles for "tight graspability," and certifies certain models as compliant

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[274] Frederick Schauer, *The Tyranny of Choice and the Rulification of Standards*, 14 J. Contemp. Legal Issues 803 (2005).

[275] *Id.* at 805-809.

[276] *See* Americans with Disabilities Act (ADA) (42 U.S.C. § 12101, et. Seq).

[277] Americans with Disabilities Act Accessibility Guidelines § 4.13.9 ("Door Hardware. Handles, pulls, latches, locks, and other operating devices on accessible doors shall have a shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist to operate.").

with this legal standard. Thus, the architect might choose to comply with this loose standard by adherence to the intermediate rule: use only such ADA certified door handles in buildings.[278] It is not difficult to imagine automating reasoning systems capturing this data in a system in which architects are attempting to automatically comply with the building code regulations. An architect, on his computerized building design, might indicate that a particular door handle will be built using a specific approved product model, which in turn, can be automatically verified as compliant under the rule. By harnessing this fact that a previously indeterminate standard has been rendered effectively determinate by decomposition through an intermediate rule, the effective domain of computability has been expanded.

2. Desirable Traits of a Formal Legal Rule

We can think of lawmakers as having a choice in regulating. They can regulate the same underlying behavior by fashioning a law as a determinate rule, or an indeterminate standard. One well-known problem is that determinate rules are often both underinclusive and overinclusive relative to the behavior that they aim to regulate.[279] Thus, to use our speed limit example once again, in passing a law that "no one shall drive a vehicle faster than 65 miles per hour," lawmakers may truly care about regulating the underlying behavior of "unsafe driving." However, the rule – "greater than 65 miles per hour" might be an administrable and formally realizable proxy for the standard "unsafe driving." While in theory, lawmakers would like to only apply the law to instances of "unsafe driving," administrability and cost issues might make this an unduly costly law to apply.

Since the rule "greater than 65 miles per hour" is only a proxy for the behavior that lawmakers would like to actually regulate, the rule is going to be both under and over inclusive to that target behavior when actually applied. Thus, we might have instances of drivers traveling at 64 miles per hour, but driving unsafely, who would fall outside the bounds of the rule. Similarly, we might see drivers traveling at 66 miles per hour in a very safe manner. The different levels of abstraction at which the rule and the standard exist make this imperfect fit inevitable.

Nonetheless, we can conceive of a metric for a desirable determinate rule. We can think of factual situations in which both the rule and the standard would apply, as the "overlap" between the two domains. For a formal rule to be an effective proxy for a standard, there should be a high degree of overlap between factual situations covered by both the rule, and the standard. Underinclusiveness occurs in factual situations when the standard applies but not the rule, and overinclusiveness occurs when the rule applies, but not the standard. Although imperfect overlap is inevitable, a high degree of overlap, with only a small percentage of cases falling under only one or the other, is the desirable metric in a good proxy rule.

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[278] Charles S. Han, Kincho H. Law, & John C. Kunz, *Making Automated Building Code Checking a Reality*, Facility Mgmt. J., Sept.-Oct. 1997, at 22-28.

[279] Surden, *supra* note 259, at 1627.

This metric has implications to the extent that lawmakers consider making more formal and determinate previously less determinate areas of law, to allow them to be processable by computers. If indeterminate areas of law are incrementally changed into more determinate areas of law, we should explicitly consider the extent to which the reformulated rules overlap with the general behavior that we desire to regulate. To the extent that the overlap is slight and many exceptions occur, the reformulated rule might be inadequate.

Prima-Facie Automated Compliance

Finally, what of the primary objection to determinate legal contexts – that they produce unjust results when officials are unable to take into account exceptional circumstances to avoid literal, but unreasonable outcomes? To reemphasize, I don't mean to suggest that lawmakers should have a policy of creating increasingly determinate laws in many, or most contexts simply to enable computability. Lawmakers need to balance the degree of overlap against other potential tradeoffs in terms of flexibility and fairness in regulation. Legal determinacy is not the primary value to be emphasized in many contexts concerning individual rights, fairness, and other fundamental concerns. This suggests a rather limited role for fully determinate contexts.

Nonetheless, there are structural concepts that might be employed to balance the tradeoff between legal certainty and official discretion, in contexts, where, for example, economic efficiency is the primary value considered. One notion is the idea that automated legal analysis is only *prima-facie* in nature. Essentially, to the extent that legal outcomes are determinate enough to be computable – such as in the personal income tax context – the result from the automated reasoning system might represent only a "first cut" or *prima-facie* legal analysis, rather than have a legally determinative effect. In different contexts, lawmakers could selectively choose what weight officials should give to computer-generated legal conclusions, and to what extent, and at what rate, to review and take objections to logically derived conclusions.

A *prima-facie* weight might have a similar effect as the restraint imposed upon official discretion by a legal presumption. In that way, it may be possible to get the efficiency benefits of automated conclusions – if the exceptions are rare – while retaining some of the flexibility for avoiding unwanted outcomes. Computerized systems are be able to precisely identify the rules and data that led to their automated *prima-facie* legal determinations. A layperson relying upon such a determination could point to this series of steps as a good-faith basis for their legal position. Nonetheless, officials or laypersons might also have opportunity to contest these automated results in some instances. In most legal contexts, we have non-officials conducting the majority of day-to-day legal analyses, with legal officials only weighing in with authoritative pronouncements occasionally in formal settings. If we could gauge the rate at which non-official *prima-facie* analyses of legal outcomes matched officially determined legal outcomes, this would be a good measure of the *ex ante* determinability of legal outcomes in that context.

Something like this might already be occurring, at least implicitly, in the personal income tax context. For some significant percentage of filers, the deductive application of the rules produces satisfactory results – so the *prima-facie* automated conclusions are sufficient and acceptable to both layperson and official. The percentage of satisfactory

cases is high enough that society can get the benefits of the efficiency gains of automating compliance. However, for some percentage of those who fall under the exceptions due to increased complexity, or to the inflexibility of legal rules, they have the opportunity to make their case through appeal if necessary. In this way, lawmakers might intelligently balance efficiency and flexibility in particular contexts.

VI. CONCLUSION

The theoretical limits and scope of automated legal analysis can best be understood through the lens of legal theory. In presenting a model for *where* in the law automated legal analysis is possible and *why*, we can think of this Article as also having developed a more general model of determinacy of legal outcomes in the law.

Within the legal literature, this Article pushes back against the view that automation of legal analysis is not possible in any area of law, by providing a means to identify relatively determinate portions even amidst a background of indeterminacy. One observation is that although the task of the lawyer in performing legal analysis mostly involves professional judgment, there is some small subset of legal analysis that is relatively mechanical.[281] A rough heuristic is that where the task of the lawyer is approximately mechanical, it is more likely to be (eventually) automatable via computers.[282] With respect to the computer science literature, this Article aims to provide a bridge for a body of scholarship that has largely not incorporated necessary insights from the legal theory canon. This lack of theoretical understanding, I believe, has hindered previous efforts in the computer science domain as effort has been devoted to projects beyond outside of their realistic scope.

Beyond the theoretical issues, this piece only tangentially touches upon several important normative topics.[283] Notably, I do not take a position as to whether automation is desirable, even when possible. This Article notes some of the claimed benefits of automating legal analysis, most notably gains in efficiency.[284] However, it is not enough

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[281] A statute of limitations is the paradigm example of a mechanical legal analysis. While it is true that statutes of limitation permit exceptions, tolling or in some instances there is uncertainty or debate about, the start period, it is probably correct to say that more often than not, in the routine day-to-day statute of limitations assessment, a statute of limitation analysis involves a simple mechanical calculation.

[282] A somewhat simplified way of thinking about the thesis is the following: Where attorneys are acting like computers in their computerized analysis, they can be replaced by computers. But, where they are not acting like computers –which comprise the vast majority of situations in the law – they cannot. Such a characterization should give the legal profession another framework to think about those significant value-added activities that attorneys perform.

[283] This normative question is crucially important, and although beyond the scope of this theoretical piece, will be the subject of future work.

[284] The first benefit typically touted, is the potential to allow greater access to the law to public than is accessible today. Access to the legal analysis, for many, is practically unattainable, because it requires the rather expensive intermediation of attorneys. Some have argued that

to mention the benefits of such systems without briefly reflecting on the costs. Generally speaking, there are several well known problems with formalist and determinate bodies of law. In particular, it is often argued that the lack of discretion characteristic in such systems reduces the availability of flexibility in judgment and often leads to unjust or oppressive results.[285] Additionally, formalist rules are often only a crude proxy for underlying regulatory goals, and are often underinclusive or overinclusive relative to the behavior that they wish to regulate.

Given the potential efficiency gains in automating legal analysis in select contexts, and the observation that more determinate and formalist laws are most amenable to automation, it is easy to imagine efficiency pressures dominating other desirable considerations in creating laws, including justice, fairness, equality, and flexibility concerns. It is important to be cautious and aware of such concerns.[286] As a preliminary matter, it seems reasonable that increased automation and determinacy is inappropriate where important rights, values, or other issues of significant consequence are at stake. Moreover, increased or near-perfect efficiency in enforcing laws is not always an unqualified good in every context. There are sometimes implicit values of freedom and self-expression embedded in the ability of the government to imperfectly enforce laws, which we society may wish to preserve. Finally, there are many scenarios where law is serving some other important societal functions not primarily concerned with the determination of "correct" legal answers. For example, other scholars have explored the ceremonial or conflict resolution role of law in society, in which correct determinations of legal conclusions are often quite beside the point. [287] Future scholarship on this topic should take these normative concerns and critiques seriously in delineating the desired scope of such automation.

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automated systems have the potential to increase access to the law in some circumstances. In some communities, where individuals are under-served, such systems could provide greater empowerment and ability to work within the law, without attorneys. Though this would likely disintermediate lawyers as to certain activities, in many instances, it could potentially reach low-income communities that practically were unable to access attorneys at all. Additionally, should automated legal reasoning systems become widespread where they are possible – there will likely be immediate efficiency and accessibility gains. Another touted benefit stems from the fact that computers are excellent at organizing complexity. The proliferation of statutes and codes can make compliance with many regulations cumbersome and overwhelming. The ability of rules-bases systems to organize and analyze the laws, and perhaps, even detect unnoticed logical contradictions within the laws is a societal benefit.

[285] Kennedy, *supra* note 178, at 1689.

[286] I don't take a position in this Article, except to note that in some areas where efficiency is a major consideration, and legal analysis by and large is mechanically conducted anyway, this might be a candidate for automation.

[287] *See, e.g.*, Robert H. Mnookin & Lewis Kornhauser, Bargaining in the Shadow of the Law: The Case of Divorce, 88 Yale L.J. 950, 993 (1979) (noting the ceremonial role of legal divorce proceedings separate and apart from their legal meaning).